



SPEC CPU2006 SPECfp_rate_base2006 performance and power consumption on multiprocessor Intel- and AMD-based servers

Executive summary

Intel® Corporation (Intel) commissioned Principled Technologies (PT) to measure the SPEC® CPU2006 performance and power consumption on multiprocessor servers running SUSE Linux Enterprise Server 10 using the following five processors:

- AMD* Opteron* 2384
- Intel® Xeon® processor X5570
- Intel Xeon processor E5472
- Intel Xeon processor 5160
- 64-bit Intel Xeon processor with 2MB L2 cache 3.6 GHz-based server (Intel Xeon processor 3.6 GHz)

SPEC CPU2006 is an industry-standard benchmark created by the Standard Performance Evaluation Corp. (SPEC) to measure a server's compute-intensive performance. The benchmark consequently stresses the CPU and memory subsystems of the system under test. (For more information on SPEC CPU2006 and other SPEC benchmarks, see www.spec.org.)

The SPEC CPU2006 benchmark consists of two benchmark suites, each of which focuses on a different aspect of compute-intensive performance. CINT2006 measures and compares compute-intensive integer performance, while CFP2006 measures and compares compute-intensive floating-point performance. A "rate" version of each, which runs multiple instances of the benchmark to assess server throughput, is also available. We ran only the CFP2006 SPECfp_rate_base2006 benchmark.

KEY FINDINGS

- The Intel Xeon processor X5570-based server delivered 77.1 percent higher performance than the AMD Opteron 2384-based server. It also delivered 122.5 percent higher performance than the Intel Xeon processor E5472-based server, 308.8 percent higher performance than the Intel Xeon processor 5160-based server, and 994.1 percent higher performance than the Intel Xeon processor 3.6 GHz-based server (see Figure 1).
- The Intel Xeon processor X5570-based server delivered 50.0 percent more performance/watt than the AMD Opteron 2384-based server. It also delivered 119.5 percent higher performance/watt than the Intel Xeon processor E5472-based server, 408.5 percent higher performance/watt than the Intel Xeon processor 5160-based server, and 966.7 percent higher performance/watt than the Intel Xeon processor 3.6 GHz-based server (see Figure 2).

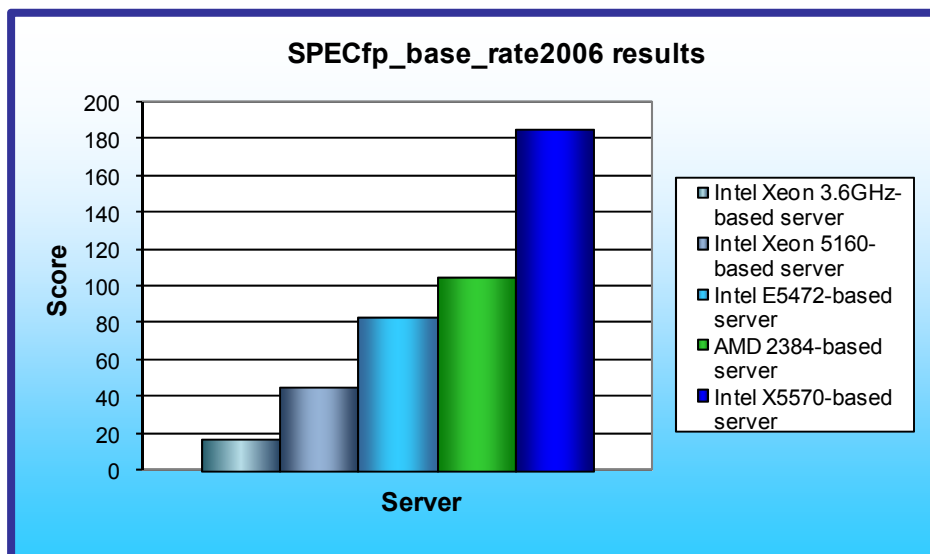


Figure 1: SPECfp_rate_base2006 results of the test servers. Higher numbers are better.

In this section, we discuss the best results for each server. For complete details of the performance of each server, see the Test results section.

Figure 1 shows the SPECfp_rate_base2006 performance of each server. The Intel Xeon processor X5570-based server achieved a score of 186. This is a 77.1 percent performance increase over the AMD Opteron 2384-based server, which achieved a score of 105. The Intel Xeon processor X5570-based server also showed a 122.5 percent

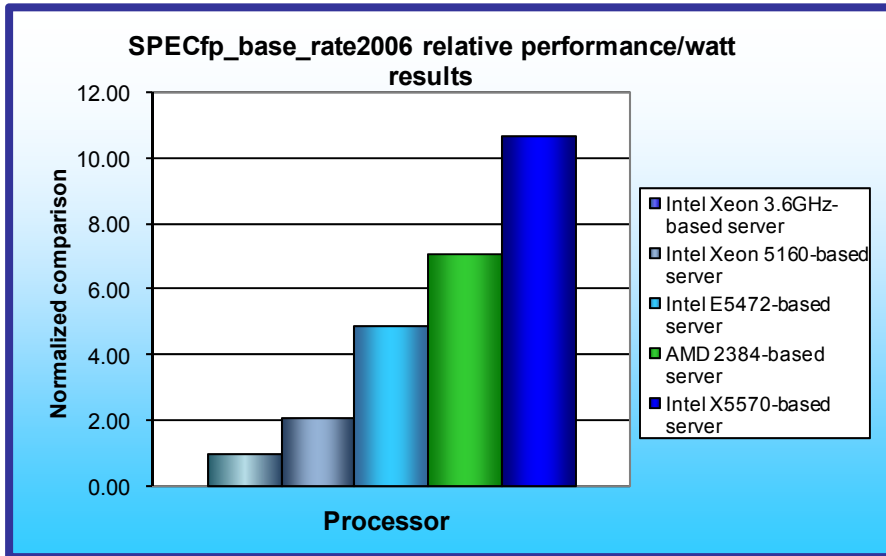


Figure 2: Normalized performance/watt results of the test servers. Higher numbers are better.

performance increase over the Intel Xeon processor E5472-based server, which achieved a score of 83.6; a 308.8 percent performance increase over the Intel Xeon processor 5160-based server, which achieved a score of 45.5; and a 994.1 percent performance increase over the Intel Xeon processor 3.6 GHz-based server, which achieved a score of 17.0.

Figure 2 illustrates the performance/watt for each of the five servers. In this chart, we normalized the results for each system to the system with the lowest performance/watt, which we set to 1.00. By normalizing, we make each data point in these charts a comparative number, with higher results indicating better

performance/watt. Thus, higher numbers are better.

To calculate the performance/watt, we used the following formula: benchmark score divided by average power consumption in watts during period of peak performance.

As Figure 2 illustrates, the Intel Xeon processor X5570-based server delivered 50.0 percent more performance/watt than the AMD Opteron 2384-based server. The Intel Xeon processor X5570-based server also delivered 119.5 percent more performance/watt than the Intel Xeon processor E5472-based server, 408.5 percent more performance/watt than the Intel Xeon processor 5160-based server, and 966.7 percent more performance/watt than the Intel Xeon processor 3.6 GHz-based server.

Workload

The SPEC CPU2006 workload includes two benchmark suites: CINT2006 and CFP2006. (Note: SPEC and SPECfp are trademarks of the Standard Performance Evaluation Corporation.) We ran only the CFP2006 benchmark, which focuses on measuring and comparing compute-intensive floating-point performance. Specifically, we measured the SPECfp_rate2006 results for the test servers with 4, 8, or 16 users.

Generally, a system achieves the best SPECfp_rate_base2006 score using the same number of users as execution units for a given server. The optimum user count for our testing was 4 users on the Intel Xeon processor 3.6 GHz- and Intel Xeon processor 5160-based servers, 8 users on the Intel Xeon processor E5472- and AMD Opteron 2384-based servers, and 16 users on the Intel Xeon processor X5570-based server. The difference in user counts between the servers is due to the different number or execution units (logical or physical processors) on those servers.

Figure 3 lists the 17 applications that compose the CFP2006 benchmark. SPEC wrote six of the applications in FORTRAN, three using C, four using both FORTRAN and C, and four in C++.

A CFP2006 run performs each of the 17 application (tasks) three times and reports the median for each. It also calculates the geometric mean of those 17 results to produce an overall score.

Name	Application area
410.bwaves	Fluid Dynamics
416.gamess	Quantum Chemistry
433.mic	Physics/Quantum Chromodynamics
434.zeusmp	Physics/CFD
435.gromacs	Biochemistry/Molecular Dynamics
436.cactusADM	Physics/General Relativity
437.leslie3d	Fluid Dynamics
444.namd	Biology/Molecular Dynamics
447.deall	Finite Element Analysis
450.soplex	Linear Programming, Optimization
453.povray	Image Ray-tracing
454.calculix	Structural Mechanics
459.GemsFDTD	Computational Electromagnetics
465.tonto	Quantum Chemistry
470.IBM	Fluid Dynamics
481.wrf	Weather
482.sphinx3	Speech recognition

Figure 3: The applications that make up the CFP2006 benchmark.

Test results

Figure 4 details the results of our tests with the optimum number of users for SPECfp_rate_base2006. We determined the number of users based on the number of execution units in a given server. We used the same number of SPECfp_rate_base2006 users as processor execution units, so there is a one-to-one ratio.

SPECfp_rate_base2006 performs three runs of each benchmark in the test suite and records the median, so the final score is a median of three runs. Higher scores are better.

Figure 4 details the power consumption, in watts, of the test servers while idle and during the benchmark. The idle power is an average of a 2-minute power recording while the server was idle. The average power is an average power for the duration of the benchmark run.

Server	SPECfp_rate_base2006 results	Idle power	Average power
AMD Opteron 2384-based server	105.0	170.3	305.9
Intel Xeon processor X5570-based server	186.0	179.1	361.2
Intel Xeon processor E5472-based server	83.6	245.0	356.3
Intel Xeon processor 5160-based server	45.5	302.0	449.3
Intel Xeon processor 3.6 GHz-based server	17.0	195.0	352.1

Figure 4: SPECfp_rate_base2006 results and power consumption, in watts, of the test servers while idle and during the benchmark.

Test methodology

Figure 5 summarizes some of the key aspects of the configurations of the server systems; Appendix A provides detailed configuration information.

Server	AMD Opteron 2384-based server	Intel Xeon X5570-based server	Intel Xeon processor E5472-based server	Intel Xeon processor 5160-based server	64-bit Intel Xeon processor with 2MB L2 cache 3.6 GHz-based server
Processor frequency	2.7 GHz	2.93 GHz	3.0 GHz	3.0 GHz	3.6 GHz
Front-side bus frequency	2.0 GT/s HyperTransport	6.4 GT/s (QPI)	1,600 MHz	1,333 MHz	800 MHz
Number of processor packages	2	2	2	2	2
Number of cores per processor package	4	4	4	2	1
Number of hardware threads per core	1	2	1	1	2
Motherboard	Supermicro H8DME-2	Supermicro X8DTN+	Supermicro X7DWN+	Supermicro X7DBE+	Supermicro X6DHT-G
Chipset	NVIDIA MCP55	Intel 5520	Intel 500P	Intel 5000P	Intel E7520
RAM	Kingston KVR800D2D4P 6/4G	Micron MT36JSZF5127 2PY-1G4D1AB	Kingston KVR800D2D4F 5K2/4G	Kingston KVR667D2D4F5/ 2G	Samsung M312L5720D Z3-CB3
Hard drive	Western Digital WD1601ABYS	Western Digital WD1600AAJS-00B4A0	Western Digital WD1600AAJS	Western Digital WD1600AAJS	Western Digital WD1600AAJS -11B4A0

Figure 5: Summary of some key aspects of the server configurations.

Intel configured and provided the four Intel Xeon processor-based servers. PT purchased the AMD Opteron processor-based server.

To maximize performance for each server, we adjusted the BIOS settings as follows:

- Intel Xeon processor 5160- and Intel Xeon processor E5472-based servers: We changed the Hardware Prefetcher and Adjacent Cache Line Prefetch to Disabled.
- Intel Xeon processor X5570 system: We disabled Turbo Mode.
- Intel Xeon processor 3.6 GHz-based system: We changed Hyper Threading Technology, Hardware Prefetcher, and Adjacent Cache Line Prefetch to Enabled and set Processor Power Management to GV3.

We made no adjustments to the AMD Opteron 2384-based system.

We began by installing a fresh copy of SUSE Linux* Enterprise Server 10 Service Pack 2. We installed the default packages, the C/C++ Compilers and Tools and disabled the firewall. We made no additional changes to the default installation options.

After the base installation, we updated the kernel on the Intel Xeon processor X5570-based server. We updated from kernel 2.6.16.60-21-smp to 2.6.16.60-0.34-smp. This new kernel provided proper C state support in SUSE

for the Intel Xeon processor X5570. This kernel did not add advantages for the other servers so we tested with kernel version 2.6.16.60-21-smp on those four systems.

SPECCPU2006 configuration

For the Intel Xeon processor 3.6 GHz--based server, we followed SPEC's standard instructions for building the CINT2006 executables. After studying the best results for this benchmark on the SPEC Web site, we chose the following software tools:

- Intel C/C++ Compiler 9.1.052
- Intel Fortrain Compiler 9.1.052
- MicroQuill SmartHeap v8.1
- Binutils 2.19

For the Intel Xeon processor 5160- and Intel Xeon processor E5472-based servers, we followed SPEC's standard instructions for building the CFP2006 executables. After studying the best results for this benchmark on the SPEC Web site, we chose the following software tools:

- Intel C/C++ Compiler 11.0.074
- Intel Fortran Compiler 11.0.074
- MicroQuill SmartHeap v8.1
- Binutils 2.19

Intel compiled and provided the SPEC CFP2006 executables, but followed SPEC's standard instructions for building the executables using the following software tools for the Intel Xeon processor X5570-based server:

- Intel C/C++ Compiler 11.0.080
- Intel Fortran Compiler 11.0.080
- MicroQuill SmartHeap v8.1
- Binutils 2.18.50.0.7.20080502

For the AMD Opteron processor 2384-based server, we followed SPEC's standard instructions for building the CFP2006 executables. After studying the best results for this benchmark on the SPEC Web site, we chose the following software tools:

- PGI Server Complete 8.0-3
- Pathscale Compiler Suite 3.2
- MicroQuill SmartHeap v8.1
- Binutils 2.19

The benchmark requires configuration files. Intel provided the configuration files used for the Intel Xeon processor X5570-based server. For the Intel processor 3.6 GHz-, Intel Xeon processor 5160-, Intel Xeon processor E5472-, and AMD Opteron 2384-based servers, we used configuration files from similar tests online. From the SPEC Web site, we chose the most recent (as of the testing for this report) SPEC CPU2006 results that used the above compiler. We copied the configuration files for those results and used them, with modifications to reflect the appropriate system information about the server under test, in our testing. The configuration files we used appear in Appendix B.

To begin the benchmark, we performed the following steps:

- Open a command prompt.
- Change to the cpu2006 directory.
- Type `./shrc` at the command prompt.
- Type `runspec -c <config file name> -r <#> -T base -v 10 fp` where

- <config file name> = name of the configuration file
- <#> = number of users (we used 4, 8, or 16 users depending on the server)

When the run completes, the benchmark puts the results in the directory /cpu2006/result. The result file names are of the form CFP2006.<number>.<suffix>. The suffixes are html, asc, raw, and pdf. The number is three digits and associates a result file with its log, e.g., CFP2006.002. asc and log.002.

Appendix C provides the SPECfp_rate_base2006 output results for each of the five test servers.

Power measurement procedure

To record each server's power consumption during each test, we used an Extech* Instruments (www.extech.com) 380803 Power Analyzer/Datalogger. We connected the power cord from the server under test to the Power Analyzer's output load power outlet. We then plugged the power cord from the Power Analyzer's input voltage connection into a power outlet.






We used the Power Analyzer's Data Acquisition Software (version 2.11) to capture all recordings. We installed the software on a separate Intel processor-based PC, which we connected to the Power Analyzer via an RS-232 cable. We captured power consumption at 1-second intervals.

To gauge the idle power usage, we recorded the power usage for 2 minutes while each server was running the operating system but otherwise idle.

We then recorded the power usage (in watts) for each server during the testing at 1-second intervals. To compute the average power usage, we averaged the power usage during the time the server was producing its peak performance results. We call this time the power measurement interval. See Figure 4 (idle and average peak power) for the results of these measurements.

Appendix A – Test system configuration information

This appendix provides detailed configuration information about each of the test servers, which we list in alphabetical order in Figure 6.

Servers	AMD Opteron 2384-based server	Intel Xeon processor X5570-based server	Intel Xeon processor E5472-based server	Intel Xeon processor 5160-based server	64-bit Intel Xeon processor with 2MB L2 cache 3.6 GHz-based server
					
General processor setup					
Number of processor packages	2	2	2	2	2
Number of cores per processor package	4	4	4	2	1
Number of hardware threads per core	1	2	1	1	2
CPU					
Vendor	AMD	Intel	Intel	Intel	Intel
Name	Opteron 2384 (Shanghai)	Xeon X5570 (Nehalem)	Xeon E5472 (Harpertown)	Xeon 5160 (Woodcrest)	Xeon with 2MB L2 cache (Irwindale)
Stepping	2	5	10	4	R0
Socket type	Socket F	LGA 1366	LGA 771	LGA 771	Socket 604
Core frequency (GHz)	2.7 GHz	2.93 GHz	3.0 GHz	3.0 GHz	3.6 GHz
Front-side bus frequency (MHz)	2.0 GT/s HyperTransport	6.4 GT/s (QPI)	1,600 MHz	1,333 MHz	800 MHz
L1 cache	64 KB + 64 KB (per core)	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)	32 KB + 32 KB (per core)	12 KB + 16 KB
L2 cache	2 MB (4 x 512 MB)	1 MB (4 x 256 KB)	12 MB (2 x 6,144 MB)	4 MB (2 x 2,048 MB)	2 MB (1 x 2,048 MB)
L3 cache	6 MB	8 MB	N/A	N/A	N/A
Platform					
Vendor and model number	Supermicro A+ Server 2021M-T2R+V	Supermicro SuperServer	Supermicro SuperServer 6025W-NTR+	Supermicro SuperServer 6025B-TR+	Supermicro 6024H-T
Motherboard model number	H8DME-2	X8DTN+	X7DWN+	X7DBE+	X6DHT-G
Motherboard chipset	NVIDIA MCP55	Intel 5520	Intel 5000P	Intel 5000P	Intel E7520
Motherboard revision number	01	1.02	1.1A	B1	01

Servers	AMD Opteron 2384-based server	Intel Xeon processor X5570-based server	Intel Xeon processor E5472-based server	Intel Xeon processor 5160-based server	64-bit Intel Xeon processor with 2MB L2 cache 3.6 GHz-based server
BIOS name and version	AMIBIOS 08.00.14 (10/13/08)	American Megatrends v4.6.3.2 (01/13/2009)	Supermicro X7DWN+ BIOS Rev 1.2 (11/04/08)	PhoenixBios v2.1 (06/23/08)	Phoenix Technologies LTD 6.00 (08/16/2007)
BIOS settings	Default	Turbo Mode Disabled	Hardware Prefetcher and Adjacent Cache Line Prefetch Disabled	Hardware Prefetcher and Adjacent Cache Line Prefetch Disabled	Hyper Threading Technology, Hardware Prefetcher and Adjacent Cache Line Prefetch Enabled Processor Power Management: GV3
Memory module					
Vendor and model number	Kingston KVR800D2D4P6 /4G	Micron MT36JSZF5127 2PY-1G4D1AB	KVR800D2D4F5 K2/4G	Kingston KVR667D2D4F5 /2G	Samsung M312L5720DZ3-CB3
Type	DDR2 PC2-6400	DDR3 PC3-10600	DDR2 PC2-6400 FB-DIMM	DDR2 PC2-5300 FB-DIMM	DDR PC2700R
Speed (MHz)	800	1333	800	667	333
Speed in the system currently running @ (MHz)	800	1333	800	667	333
Timing/Latency (tCL-tRCD-iRP-tRASmin)	6-6-6-18	9-9-9-24	5-5-5-15	5-5-5-15	2.5-3-3-10
Size	4 GB	4 GB	2 GB	2 GB	2 GB
Number of RAM modules	8 x 4 GB	6 x 4 GB	8 x 2 GB	8 x 2 GB	8 x 2 GB
Chip organization	Double-sided	Double-sided	Double-sided	Double-sided	Double-sided
Hard disk					
Vendor and model number	Western Digital WD1601ABYS	Western Digital WD1600AAJS-00B4A0	Western Digital WD1600AAJS	Western Digital WD1600AAJS	Western Digital WD1600AAJS-11B4A0
Number of disks in system	1	1	1	1	1
Size	160 GB	160 GB	160 GB	160 GB	160 GB
Buffer size	16 MB	8 MB	8 MB	8 MB	16 MB
RPM	7,200	7,200	7,200	7,200	7,200 RPM
Type	SATA	SATA	SATA	SATA	SATA
Controller	NVIDIA nForce SATA controller	Intel Corporation ICH10 SATA AHCI Controller	Intel Corporation 631xESB/632xE SB/3100 SATA Controller	Intel ESB2 RAID Controller	Adaptec Serial ATA HostRAID

Servers	AMD Opteron 2384-based server	Intel Xeon processor X5570-based server	Intel Xeon processor E5472-based server	Intel Xeon processor 5160-based server	64-bit Intel Xeon processor with 2MB L2 cache 3.6 GHz-based server
Driver version	3.3	2.0	2.00ac7	2.00ac7	2.0
Operating system					
Name	SLES 10 SP2	SLES 10 SP2	SLES 10 SP2	SLES 10 SP2	SLES 10 SP2
Build number	#1 SMP Tue May 6	#1 SMP Tue May 6	#1 SMP Tue May 6	#1 SMP Tue May 6	#1 SMP Tue May 6
File system	Reiserfs	Reiserfs	Reiserfs	Reiserfs	Reiserfs
Kernel	2.6.16.60-0.21-smp	2.6.16.60-0.34-smp	2.6.16.60-0.21-smp	2.6.16.60-0.21-smp	2.6.16.60-0.21-smp
Language	English	English	English	English	English
Name	SLES 10 SP2	SLES 10 SP2	SLES 10 SP2	SLES 10 SP2	SLES 10 SP2
Graphics					
Vendor and model number	ATI ES1000	ATI ES1000	ATI ES1000	ATI ES1000	ATI Rage XL SVGA PCI Video
Chipset	ES1000	ES1000	ES1000	ES1000	ATI Rage XL
Type	Integrated	Integrated	Integrated	Integrated	Integrated
Memory size	16 MB	32 MB	32 MB	16 MB	8 MB
Resolution	1,024x768	1,024x768	1,024x768	1,024x768	1,024x768
Network card/subsystem					
Vendor and model number	Intel Pro/1000	Intel 82576EB Gigabit Ethernet	Intel Pro/1000 EB	Intel Pro/1000 EB	Intel PRO/1000 MT
Type	Integrated	Integrated	Integrated	Integrated	Integrated
Optical drive					
Vendor and model number	Matshita DVD-ROM UJDA780	Slimtype DVD A DS8A1P	Panasonic DVD-ROM	Matshita DVD-ROM SR-8178	TEAC CD-224E-N
USB ports					
Number	4	4	4	4	2
Type	USB 2.0	USB 2.0	USB 2.0	USB 2.0	USB 2.0
Power supplies					
Total number	2	2	2	2	1
Wattage of each	700W	805W	700W	700W	550W
Cooling fans					
Total number	3	3	3	3	4
Dimensions	3" x 3"	3" x 3"	3" x 3"	3" x 3"	3.25" x 3.25"
Voltage	12V	12V	12V	12V	12V
Amps	1.1A	1.1A	1.1A	1.1A	1.1A

Figure 6: Detailed system configuration information for the five test servers.

Appendix B – SPECfp_rate_base2006 configuration files

This appendix contains the benchmark configuration files we used to test the servers.

SUSE Linux Enterprise Server 10: AMD Opteron 2384-based server

```
#####
# AMD SPEC CPU2006 V1.1 Configuration File for 64-bit Linux (Quad-Core)
#
#   CPU2006 Version           1.1
#   Compiler name/version:    PGI 7.2, Pathscale 3.2
#   Operating system version: 64-bit Linux
#   Hardware:                 AMD Opteron (Quad-core)
#   FP Base Pointer Size:     64-bit only
#   FP Peak Pointer Size:     32/64-bit
#   INT Base Pointer Size:    32/64-bit
#   INT Peak Pointer Size:    32/64-bit
#   Auto Parallization:       Yes
#
# Important! Please run with your stack size set to 'unlimited'.
# Failure to do so may cause 483.xalanbmk to get a stack overflow during
# execution.
# Using csh:  unlimited
# Using bash: ulimit -s unlimited
#
# Your LD_LIBRARY_PATH must be set to the location of the dependent
# runtime libraries. (Though this should be taken care of by the
# preENV_LD_LIBRARY_PATH found in the AMD909gh-sut.inc file.)
#
# The NCPUS environment variable must be set for the run. This
# is passed to runspec by using --define NPCUS=4 on the runspec
# command and is used to set an environment variable in the
# AMD909gh-sut.inc file.
#
# If building new binaries, please adjust the SMARTHEAP_DIR variable to
# the directory containing the Smartheap library.
#
#####
# Macro section
#####
# Modify this section to use the appropriate architecture flags
#define pgi_tp64 -tp barcelona-64
#define pgi_tp32 -tp barcelona-32

# Adjust the build jobs to the number of concurrent build processes
#define build_jobs 4

#####
# Header Section
#####
ext           = amd909gh
ignore_errors = no
tune          = base,peak
output_format = asc,pdf,raw,flags,cfg,html,csv

flagsurl000   = http://www.spec.org/cpu2006/flags/pgi80_linux_flags.xml
flagsurl001   = http://www.spec.org/cpu2006/flags/CPU2006_flags.20081112.xml
flagsurl002   = http://www.spec.org/cpu2006/flags/amd-platform-amd909gh.xml

size          = test,train,ref
check_md5     = yes
reportable    = yes
env_vars      = no
teeout        = yes
mean_anyway   = yes
verbose       = 6

makeflags     = -j ${build_jobs}
```

```

#####
# Include file containing the SUT hardware information
# as well as the submit command, tester information and notes
#####
#include: AMD909gh-sut.inc
# ---- Begin inclusion of 'AMD909gh-sut.inc'
#####
#####
# Pre-Environment settings
#####

# These settings require using 4GB DIMMs - 4 per socket

# For rate runs, use the following below:
# In /etc/sysctl.conf, 1P configuration, use vm/nr_hugepages=3584
# In /etc/sysctl.conf, 2P configuration, use vm/nr_hugepages=7168
# In /etc/sysctl.conf, 4P configuration, use vm/nr_hugepages=14336

# Document amount of run time system hugepages setting
# What is vm/nr_hugepages is set to in /etc/sysctl.conf?
%define rt_sys_hp 7168

# Set number of sockets being used
%define num_sockets 2

# Set NCPUS environment variable for PGI autopar binaries
#ifdef %{NCPUS}
    preENV_NCPUS=%{NCPUS}
#endif

# Set location of run time libraries
preENV_LD_LIBRARY_PATH = /usr/cpu2006/SmartHeap_8.1/lib

# Need this for libhugetlbfs library usage for Pathscale binaries
preENV_HUGETLB_MORECORE=yes

# Run the sync command after setup
post_setup=sync

#####
# Submit Section
#####
# This config file is set to run these binaries on a 4P, 16 core system.
# If this does not match the description of your system, change this
# config file, specifically match the socket the memroy is bound (-m) to
# the physical cpu number. Use "man numactl" and "numactl --hardware" to
# better understand how to use this command.

submit0    = echo "$command" > run.sh
submit1    = if `test $$SPECCOPYNUM -eq 0 `; then numactl -m 0 --physcpubind=0 sh run.sh; fi
submit2    = if `test $$SPECCOPYNUM -eq 1 `; then numactl -m 0 --physcpubind=1 sh run.sh; fi
submit3    = if `test $$SPECCOPYNUM -eq 2 `; then numactl -m 0 --physcpubind=2 sh run.sh; fi
submit4    = if `test $$SPECCOPYNUM -eq 3 `; then numactl -m 0 --physcpubind=3 sh run.sh; fi
submit5    = if `test $$SPECCOPYNUM -eq 4 `; then numactl -m 1 --physcpubind=4 sh run.sh; fi
submit6    = if `test $$SPECCOPYNUM -eq 5 `; then numactl -m 1 --physcpubind=5 sh run.sh; fi
submit7    = if `test $$SPECCOPYNUM -eq 6 `; then numactl -m 1 --physcpubind=6 sh run.sh; fi
submit8    = if `test $$SPECCOPYNUM -eq 7 `; then numactl -m 1 --physcpubind=7 sh run.sh; fi
submit9    = if `test $$SPECCOPYNUM -eq 8 `; then numactl -m 2 --physcpubind=8 sh run.sh; fi
submit10   = if `test $$SPECCOPYNUM -eq 9 `; then numactl -m 2 --physcpubind=9 sh run.sh; fi
submit11   = if `test $$SPECCOPYNUM -eq 10 `; then numactl -m 2 --physcpubind=10 sh run.sh; fi
submit12   = if `test $$SPECCOPYNUM -eq 11 `; then numactl -m 2 --physcpubind=11 sh run.sh; fi
submit13   = if `test $$SPECCOPYNUM -eq 12 `; then numactl -m 3 --physcpubind=12 sh run.sh; fi
submit14   = if `test $$SPECCOPYNUM -eq 13 `; then numactl -m 3 --physcpubind=13 sh run.sh; fi
submit15   = if `test $$SPECCOPYNUM -eq 14 `; then numactl -m 3 --physcpubind=14 sh run.sh; fi
submit16   = if `test $$SPECCOPYNUM -eq 15 `; then numactl -m 3 --physcpubind=15 sh run.sh; fi

# SPEED
# For a speed run, the submit1 command above will be used.

```

```

#
use_submit_for_speed = 1

#####
# Tester information
#####
license_num      = 3184
prepared_by     = Principled Technologies, Inc.
tester          = Principled Technologies, Inc.
test_sponsor    = Intel Corp.
hw_vendor       = Supermicro Computer, Inc.
hw_model        = AMD Opteron 2384

#####
# Hardware information
#####
default=default=default=default:
hw_avail        = Nov-2008
hw_cpu_name     = AMD Opteron 2384
hw_cpu_mhz     = 2700
hw_fpu          = Integrated
hw_nchips       = 2
hw_ncores      = 8
hw_ncoresperchip = 4
hw_nthreadspercore = 1
hw_ncpuorder   = 1,2 chips
hw_pcache      = 64 KB I + 64 KB D on chip per core
hw_scache      = 512 KB I+D on chip per core
hw_tcache      = 6 MB I+D on chip per chip
hw_ocache      = None
hw_disk        = 1 x 160 GB SATA, 7200 RPM
hw_memory      = 32 GB (8x4 GB, DDR2 PC2-6400)
hw_other       = None
sw_file        = ReiserFS
sw_os000       = SuSE Linux Enterprise Server 10 (x86_64) SP2,
sw_os001       = Kernel 2.6.16-60.0.21-smp
sw_state       = Run level 3 (Full multiuser with network)

#####
# Notes
#####
notes_submit_000 = 'numactl' was used to bind copies to the cores

notes_os_000 = The libhugetlbfs libraries were installed using the
notes_os_005 = installation rpms that came with the distribution.
notes_os_010 =
notes_os_015 = 'ulimit -s unlimited' was used to set environment stack size
notes_os_020 = 'ulimit -l 2097152' was used to set environment locked pages in memory limit
notes_os_025 =
notes_os_030 = Set vm/nr_hugepages=7168 in /etc/sysctl.conf
notes_os_035 = mount -t hugetlbfs nodev /mnt/hugepages
notes_os_040 =

# Uncomment this if you used this for a speed run
#notes_os_045 = powersave -f was used to set the CPU frequency to its maximum.
# ---- End inclusion of '/root/work/cpu2006-amd909gh/config/AMD909gh-sut.inc'

##### Software Info #####
fp=default=default=default:
sw_base_ptrsize = 64-bit
sw_peak_ptrsize = 32/64-bit
sw_avail        = Feb-2009
sw_compiler000  = PGI Server Complete Version 8.0-3
sw_compiler001  = PathScale Compiler Suite Version 3.2
sw_other000     = binutils 2.19
sw_other001     = 32-bit and 64-bit libhugetlbfs libraries
sw_parallel_other = Yes

int=default=default=default:

```

```

sw_base_ptrsize = 32/64-bit
sw_peak_ptrsize = 32/64-bit
sw_avail        = Feb-2009
sw_compiler000  = PGI Server Complete Version 8.0-3
sw_compiler001  = PathScale Compiler Suite Version 3.2
sw_other000     = binutils 2.19
sw_other001     = 32-bit and 64-bit libhugetlbfs libraries
sw_other002     = SmartHeap 8.1 32-bit Library for Linux
sw_parallel_other = No

default=default=default=default:
#####
# Compiler selection
#####
CC          = pgcc
CXX         = pgcpp
FC          = pgf95

SMARTHEAP_DIR = /usr/cpu2006/SmartHeap_8.1/lib
HUGEPAGE64    = -Wl,-T/usr/share/libhugetlbfs/ldscripts/elf_x86_64.xBDT -L/usr/lib64 -lhugetlbfs
HUGEPAGE32    = -L/usr/lib -lhugetlbfs

#####
# Portability
#####
# Set for all base and peak benchmarks unless changed below
fp=default=default=default:
PORTABILITY = -DSPEC_CPU_LP64

int=default=default=default:
PORTABILITY = -DSPEC_CPU_LP64

#####
# INT Base Flags
#####
int=base=default=default:
COPTIMIZE   = -fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=jobs:{build_jobs},fast,inline %{pgi_tp64}
CXXOPTIMIZE = -fastsse -Msmartalloc=huge -Mfprelaxed --zc_eh -Mipa=jobs:{build_jobs},fast,inline:6
%{pgi_tp32}
OPTIMIZE    = -Mvect=cachesize:6291456
EXTRA_LDFLAGS = -Bstatic_pgi

#####
# FP Base Flags
#####
fp=base=default=default:
COPTIMIZE   = -fastsse -Msmartalloc=huge -Mfprelaxed -Mipa=jobs:{build_jobs},fast,inline %{pgi_tp64}
FOPTIMIZE   = -fastsse -Mfprelaxed -Msmartalloc=huge -Mipa=jobs:{build_jobs},fast,inline %{pgi_tp64}
CXXOPTIMIZE = -fastsse -Msmartalloc=huge -Mfprelaxed --zc_eh -Mipa=jobs:{build_jobs},fast,inline
%{pgi_tp64}
OPTIMIZE    = -Mvect=cachesize:6291456
EXTRA_LDFLAGS = -Bstatic_pgi

#####
# INT Portability Flags
#####
400.perlbench=default=default=default:
CPORTABILITY = -DSPEC_CPU_LINUX_X64

403.gcc=peak=default=default:
# Needed to avoid -DSPEC_CPU_LP64 on 32-bit codes
PORTABILITY =

429.mcf=peak=default=default:
# Needed to avoid -DSPEC_CPU_LP64 on 32-bit codes
PORTABILITY =

462.libquantum=default=default=default:
CPORTABILITY = -DSPEC_CPU_LINUX

```

```

471.omnetpp=base=default=default:
# Needed to avoid -DSPEC_CPU_LP64 on 32-bit codes
PORTABILITY      =

473.astar=default=default=default:
# Needed to avoid -DSPEC_CPU_LP64 on 32-bit codes
PORTABILITY      =

483.xalancbmk=default=default=default:
CXXPORTABILITY   = -DSPEC_CPU_LINUX
# Needed to avoid -DSPEC_CPU_LP64 on 32-bit codes
PORTABILITY      =

#####
# INT Peak Flags
#####
# PATHSCALE
400.perlbench=peak=default=default:
CC               = pathcc -march=barcelona
COPTIMIZE        = -Ofast -IPA:plimit=20000:field_reorder=on -LNO:opt=0 -WOPT:if_conv=0 -
CG:local_sched_alg=1
PASS1_CFLAGS     = -fb_create fbdata
PASS1_LDFLAGS    = -fb_create fbdata
PASS2_CFLAGS     = -fb_opt fbdata
PASS2_LDFLAGS    = -fb_opt fbdata $(HUGEPAGE64)
feedback         = 1
basepeak         = 0

# PATHSCALE
401.bzip2=peak=default=default:
CC               = pathcc -march=barcelona
COPTIMIZE=-O3 -OPT:alias=disjoint -OPT:Ofast:goto=off -INLINE:aggressive=on -CG:local_sched_alg=1 -
m3dnw $(HUGEPAGE64)
feedback         = 0
basepeak         = 0

# PATHSCALE
403.gcc=peak=default=default:
CC               = pathcc -march=barcelona
COPTIMIZE        = -Ofast -OPT:malloc_alg=1 -LNO:trip_count=256:prefetch Ahead=10 -CG:prefer_lru_reg=off -
m32
PASS1_CFLAGS     = -fb_create fbdata
PASS1_LDFLAGS    = -fb_create fbdata
PASS2_CFLAGS     = -fb_opt fbdata
PASS2_LDFLAGS    = -fb_opt fbdata
feedback         = 1
basepeak         = 0

# PATHSCALE
429.mcf=peak=default=default:
CC               = pathcc -march=barcelona
COPTIMIZE        = -O3 -ipa -INLINE:aggressive=on -CG:gcm=off -GRA:prioritize_by_density=on -m32
$(HUGEPAGE32)
feedback         = 0
basepeak         = 0

# PATHSCALE
445.gobmk=peak=default=default:
CC               = pathcc -march=barcelona
COPTIMIZE        = -O3 -OPT:alias=restrict -LNO:prefetch=1:ignore_feedback=off -CG:p2align=on
PASS1_CFLAGS     = -fb_create fbdata
PASS1_LDFLAGS    = -fb_create fbdata
PASS2_CFLAGS     = -fb_opt fbdata
PASS2_LDFLAGS    = -fb_opt fbdata $(HUGEPAGE64)
feedback         = 1
basepeak         = 0

# PGI
456.hmmmer=peak=default=default:
CC               = pgcc

```



```

COPTIMIZE      = -fastsse -Mvect=partial -Munroll=n:8 -Msmartalloc=huge -Msafeptr -Mprefetch=t0 -
Mfprelaxed     -Mipa=jobs:%{build_jobs},const,ptr,arg,inline  %{pgi_tp64}
OPTIMIZE       = -Mvect=cachesize:6291456
EXTRA_LDFLAGS  = -Bstatic_pgi
feedback       = 0
basepeak      = 0

# PATHSCALE
458.sjeng=peak=default=default:
CC              = pathcc -march=barcelona
%ifdef %{gnu3_fe}
  COPTIMIZE     = -O3 -ipa -LNO:ignore_feedback=off:full_unroll=10:fusion=0:fission=2 -
IPA:plimit=50000:pu_reorder=2 -CG:ptr_load_use=0 -OPT:unroll_times_max=8 -INLINE:aggressive=on
%else
  COPTIMIZE     = -O3 -ipa -LNO:ignore_feedback=off:full_unroll=10:fusion=0:fission=2 -IPA:pu_reorder=2 -
CG:ptr_load_use=0 -OPT:unroll_times_max=8 -INLINE:aggressive=on
%endif
PASS1_CFLAGS   = -fb_create fbdata
PASS1_LDFLAGS  = -fb_create fbdata
PASS2_CFLAGS   = -fb_opt fbdata
PASS2_LDFLAGS  = -fb_opt fbdata $(HUGEPAGE64)
feedback       = 1
basepeak      = 0

# PGI
462.libquantum=peak=default=default:
CC              = pgcc
COPTIMIZE      = -fastsse -Munroll=m:8 -Msmartalloc=huge -Mprefetch=distance:4 -Mfprelaxed -
Mipa=jobs:%{build_jobs},fast,inline,noarg %{pgi_tp64}
OPTIMIZE       = -Mvect=cachesize:6291456
EXTRA_LDFLAGS  = -Bstatic_pgi
feedback       = 0
basepeak      = 0

# PATHSCALE
464.h264ref=peak=default=default:
CC              = pathcc -march=barcelona
COPTIMIZE      = -O3 -IPA:plimit=20000 -OPT:alias=disjoint -LNO:prefetch=0 -
CG:ptr_load_use=0:push_pop_int_saved_regs=off:prefer_lru_reg=off
PASS1_CFLAGS   = -fb_create fbdata
PASS1_LDFLAGS  = -fb_create fbdata
PASS2_CFLAGS   = -fb_opt fbdata
PASS2_LDFLAGS  = -fb_opt fbdata $(HUGEPAGE64)
feedback       = 1
basepeak      = 0

# PGI
471.omnetpp=peak=default=default:
feedback       = 0
basepeak      = 1

# PGI
473.astar=peak=default=default:
CXX            = pgcpp
CXXOPTIMIZE    = -fastsse -O4 -Msmartalloc=huge -Msafeptr=global -Mfprelaxed --zc_eh  %{pgi_tp32}
OPTIMIZE       = -Mvect=cachesize:6291456
EXTRA_LDFLAGS  = -Bstatic_pgi
PASS1_CXXFLAGS = -Mphi
PASS1_LDFLAGS  = -Mphi
PASS2_CXXFLAGS = -Mphi -Mipa=jobs:%{build_jobs},fast,inline:6
PASS2_LDFLAGS  = -Mphi -Mipa=jobs:%{build_jobs},fast,inline:6
feedback       = 1
basepeak      = 0

# PATHSCALE
483.xalancbmk=peak=default=default:
CXX            = pathCC -march=barcelona
CXXOPTIMIZE    = -Ofast -INLINE:aggressive=on -m32
EXTRA_CXXLIBS  = -L$(SMARTHEAP_DIR) -lsmartheap
feedback       = 0

```

```

basepeak      = 0

#####
# FP Portability
#####
435.gromacs=base=default=default:
LDPORTABILITY = -Mnomain

436.cactusADM=default=default=default:
LDPORTABILITY = -Mnomain

447.dealII=default=default:
#ifdef % {gnu3_fe}
    CXXPORTABILITY = -DSPEC_CPU_TABLE_WORKAROUND
#else
    CXXPORTABILITY =
#endif

447.dealII=peak=default:
# Needed to avoid -DSPEC_CPU_LP64 on 32-bit codes
PORTABILITY   =

454.calculix=default=default=default:
LDPORTABILITY = -Mnomain

450.soplex=peak=default=default:
# Needed to avoid -DSPEC_CPU_LP64 on 32-bit codes
PORTABILITY   =

481.wrf=base=default=default:
CPORTABILITY  = -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX

481.wrf=peak=default=default:
FPORABILITY   = -fno-second-underscore
CPORTABILITY  = -DSPEC_CPU_LINUX

#####
# FP Peak Flags
#####
# PGI
410.bwaves=peak=default=default:
FC             = pgf95
FOPTIMIZE     = -fastsse -Msmartalloc -Mprefetch=nta -Mfprelaxed -Mipa=jobs: {build_jobs},fast,inline
               % {pgi_tp64}
OPTIMIZE      = -Mvect=cachesize:6291456
EXTRA_LDFLAGS = -Bstatic_pgi
feedback      = 0
basepeak      = 0

# PATHSCALE
416.gamess=peak=default=default:
FC             = pathf95 -march=barcelona
FOPTIMIZE     = -O2 -OPT:Ofast:ro=3:unroll_size=256
PASS1_FFLAGS  = -fb_create fbdata
PASS1_LDFLAGS = -fb_create fbdata
PASS2_FFLAGS  = -fb_opt fbdata
PASS2_LDFLAGS = -fb_opt fbdata $ (HUGEPAGE64)
feedback      = 1
basepeak      = 0

# PGI
433.milc=peak=default=default:
feedback      = 0
basepeak      = 1

# PGI
434.zeusmp=peak=default=default:
FC             = pgf95
FOPTIMIZE     = -fastsse -Mfprelaxed -Mprefetch=distance:8,t0 -Msmartalloc=huge,hugebss -
Mipa=jobs: {build_jobs},fast,inline % {pgi_tp64}

```

```

OPTIMIZE      = -Mvect=cachesize:6291456
EXTRA_LDFLAGS = -Bstatic_pgi
feedback      = 0
basepeak      = 0

# PATHSCALE
435.gromacs=peak=default=default:
CC             = pathcc -march=barcelona
FC             = pathf95 -march=barcelona
COPTIMIZE     = -Ofast -OPT:rsqrt=2 -OPT:malloc_alg=1 $(HUGEPAGE64)
FOPTIMIZE     = -Ofast -OPT:rsqrt=2 -OPT:malloc_alg=1 $(HUGEPAGE64)
feedback      = 0
basepeak      = 0

# PGI
436.cactusADM=peak=default=default:
CC             = pgcc
FC             = pgf95
COPTIMIZE     = -fastsse -Mconcur -Msmartalloc=huge -Mfprelaxed -Mipa=jobs:%{build_jobs},fast,inline
%{pgi_tp64}
FOPTIMIZE     = -fastsse -Mconcur -Mfprelaxed -Msmartalloc=huge -Mipa=jobs:%{build_jobs},fast,inline
%{pgi_tp64}
OPTIMIZE      = -Mvect=cachesize:6291456
EXTRA_LDFLAGS = -Bstatic_pgi
submit0       = echo "$command" > run.sh
submit1       = if `test $SPECCOPYNUM -eq 0 `; then numactl -m 0 --physcpubind=0,1,2,3 sh run.sh; fi
submit2       = if `test $SPECCOPYNUM -eq 1 `; then numactl -m 1 --physcpubind=4,5,6,7 sh run.sh; fi
submit3       = if `test $SPECCOPYNUM -eq 2 `; then numactl -m 2 --physcpubind=8,9,10,11 sh run.sh; fi
submit4       = if `test $SPECCOPYNUM -eq 3 `; then numactl -m 3 --physcpubind=12,13,14,15 sh run.sh; fi
copies        = %{num_sockets}
feedback      = 0
basepeak      = 0

# PGI
437.leslie3d=peak=default=default:
FC             = pgf95
FOPTIMIZE     = -fastsse -Mvect=fuse -Msmartalloc=huge -Mprefetch=distance:8,t0 -Mfprelaxed %{pgi_tp64}
OPTIMIZE      = -Mvect=cachesize:6291456
EXTRA_LDFLAGS = -Bstatic_pgi
PASS1_FFLAGS  = -Mpfi=indirect
PASS1_LDFLAGS = -Mpfi=indirect
PASS2_FFLAGS  = -Mpfo=indirect -Mipa=jobs:%{build_jobs},fast,inline
PASS2_LDFLAGS = -Mpfo=indirect -Mipa=jobs:%{build_jobs},fast,inline
feedback      = 1
basepeak      = 0

# PGI
444.namd=peak=default=default:
CXX           = pgc++
CXXOPTIMIZE   = -fastsse -Munroll=n:4,m:8 -Msmartalloc=huge -Mnodepchk -Mfprelaxed --zc_eh %{pgi_tp64}
OPTIMIZE      = -Mvect=cachesize:6291456
EXTRA_LDFLAGS = -Bstatic_pgi
PASS1_CXXFLAGS = -Mpfi
PASS1_LDFLAGS = -Mpfi
PASS2_CXXFLAGS = -Mpfo -Mipa=jobs:%{build_jobs},fast,inline
PASS2_LDFLAGS = -Mpfo -Mipa=jobs:%{build_jobs},fast,inline
feedback      = 1
basepeak      = 0

# PATHSCALE
447.dealIII=peak=default=default:
CXX           = pathCC -march=barcelona
%ifdef %gnu3_fe
  CXXOPTIMIZE = -Ofast -INLINE:aggressive=on -LNO:opt=0 -OPT:alias=disjoint -fno-exceptions -m32
%else
  CXXOPTIMIZE = -Ofast -static -INLINE:aggressive=on -fno-exceptions -m32
  LDCXXFLAGS=-lm
%endif
feedback      = 0
basepeak      = 0

```

```

# PATHSCALE
450.soplex=peak=default=default:
CXX          = pathCC -march=barcelona
CXXOPTIMIZE  = -O3 -INLINE:aggressive=on -
OPT:IEEE_arith=3:IEEE_NaN_Inf=off:fold_unsigned_relops=on:malloc_alg=1 -CG:load_exe=0 -fno-exceptions -
m32
PASS1_CXXFLAGS = -fb_create fbdata
PASS1_LDFLAGS  = -fb_create fbdata
PASS2_CXXFLAGS = -fb_opt fbdata
PASS2_LDFLAGS  = -fb_opt fbdata $(HUGEPAGE32)
feedback      = 1
basepeak      = 0

# PATHSCALE
453.povray=peak=default=default:
CXX          = pathCC -march=barcelona
CXXOPTIMIZE  = -Ofast -INLINE:aggressive=on
PASS1_CXXFLAGS = -fb_create fbdata
PASS1_LDFLAGS  = -fb_create fbdata
PASS2_CXXFLAGS = -fb_opt fbdata
PASS2_LDFLAGS  = -fb_opt fbdata
feedback      = 1
basepeak      = 0

# PGI
454.calculix=peak=default=default:
CC          = pgcc
FC          = pgf95
COPTIMIZE   = -fastsse -Msmartalloc=huge -Mprefetch=t0 -Mpre -Mfprelaxed %{pgi_tp64}
FOPTIMIZE   = -fastsse -Msmartalloc=huge -Mprefetch=t0 -Mpre -Mfprelaxed %{pgi_tp64}
OPTIMIZE    = -Mvect=cachesize:6291456
EXTRA_LDFLAGS = -Bstatic_pgi
PASS1_CFLAGS = -Mpfi=indirect
PASS1_FFLAGS = -Mpfi=indirect
PASS1_LDFLAGS = -Mpfi=indirect
PASS2_CFLAGS = -Mpfo=indirect -Mipa=jobs:%{build_jobs},fast,inline
PASS2_FFLAGS = -Mpfo=indirect -Mipa=jobs:%{build_jobs},fast,inline
PASS2_LDFLAGS = -Mpfo=indirect -Mipa=jobs:%{build_jobs},fast,inline
feedback     = 1
basepeak     = 0

# PATHSCALE
459.GemsFDTD=peak=default=default:
FC          = pathf95 -march=barcelona
FOPTIMIZE   = -Ofast -LNO:fission=2:simd=2:prefetch Ahead=1 -CG:load_exe=0 -CG:prefer_lru_reg=off -
OPT:malloc_alg=1 $(HUGEPAGE64)
feedback     = 0
basepeak     = 0

# PATHSCALE
465.tonto=peak=default=default:
FC          = pathf95 -march=barcelona
FOPTIMIZE   = -Ofast -OPT:alias=no_f90_pointer_alias -LNO:blocking=off -CG:load_exe=1 -IPA:plimit=525
-OPT:malloc_alg=1 $(HUGEPAGE64)
feedback     = 0
basepeak     = 0

# PGI
470.lbm=peak=default=default:
CC          = pgcc
COPTIMIZE   = -fastsse -Msmartalloc=huge -Mprefetch=t0 -Mloop32 -Mfprelaxed -
Mipa=jobs:%{build_jobs},fast,inline %{pgi_tp64}
OPTIMIZE    = -Mvect=cachesize:6291456
EXTRA_LDFLAGS = -Bstatic_pgi
feedback     = 0
basepeak     = 0

# PATHSCALE
481.wrf=peak=default=default:

```

```

CC          = pathcc -march=barcelona
FC          = pathf95 -march=barcelona
COPTIMIZE  = -Ofast -LNO:blocking=off:prefetch Ahead=10 -LANG:copyinout=off -IPA:callee_limit=5000 -
GRA:prioritize_by_density=on -OPT:malloc_alg=1 -m3dnow $(HUGEPAGE64)
FOPTIMIZE  = $(COPTIMIZE)
feedback   = 0
basepeak   = 0

```

```

# PGI
482.sphinx3=peak=default=default:
CC          = pgcc
COPTIMIZE  = -fastsse -Mfprelaxed -Msmartalloc %{pgi_tp64}
OPTIMIZE   = -Mvect=cachesize:6291456
EXTRA_LDFLAGS = -Bstatic_pgi
PASS1_CFLAGS = -Mpfi=indirect
PASS1_LDFLAGS = -Mpfi=indirect
PASS2_CFLAGS = -Mpfo=indirect -Mipa=jobs:{build_jobs},fast,inline
PASS2_LDFLAGS = -Mpfo=indirect -Mipa=jobs:{build_jobs},fast,inline
feedback   = 1
basepeak   = 0

```

SUSE Linux Enterprise Server 10: Intel Xeon processor X5570-based server

```

#####
# This is a sample config file. It was tested with:
#
#   Compiler name/version:      Intel Compiler 11.0
#   Operating system version:   64-Bit SUSE LINUX Enterprise Server 10 or later
#   Hardware:                   Intel processors supporting SSE4.2
#
#####
# SPEC CPU2006 Intel Linux64 config file
# July 2008 Intel Compiler 11.0 for Linux64
#####
action      = validate
tune        = base
ext         = cpu2006.1.1.ic11.0.linux64.sse42.rate.feb2009
PATHSEP     = /
check_md5=1
reportable=1

#
# These are listed as benchmark-tuning-extension-machine
#
default=default=default=default:
CC = icc
CXX = icpc
FC=ifort
OBJ = .o
SMARTHEAP_DIR = /spec/cpu2006.1.1/lib

# For UP systems, we need to know if the processors are ordered across cores first or in order
# If across cores, processors 0, 1, 2 and 3 are on distinct physical cores
# Otherwise, processors 0, 2, 4 and 6 are on distinct physical cores
#ifdef %{up-nhm}

#ifdef %{physicalfirst}
bind= 0, 1, 2, 3, 4, 5, 6, 7
#endif

#ifdef %{physicallogical}
bind= 0, 2, 4, 6, 1, 3, 5, 7
#endif

#endif

#ifdef %{dp-nhm}

#ifdef %{physicalfirst}

```

```

bind= 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
#endif

#ifdef %{physicallogical}
bind= 0, 2, 4, 6, 8, 10, 12, 14, 1, 3, 5, 7, 9, 11, 13, 15
#endif

#endif

#ifdef %{4p-nhm}

bind= <<EOT
 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25,
26, 27, 28, 29, 30, 31,
32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57,
58, 59, 60, 61, 62, 63
EOT

#endif

submit          = numactl --localalloc --physcpubind=$BIND $command

#####
# Compiler options
# for Nehalem use -xSSE4.2
# for processors prior to dunnington, replace -xSSE4.1 with -xSSE3
#####

SSE              = -xSSE4.2
FAST             = $(SSE) -ipo -O3 -no-prec-div -static
FASTNOSTATIC    = $(SSE) -ipo -O3 -no-prec-div

#####
#
# portability & libraries
#
##### Portability Flags and Notes #####

400.perlbench=default:
CPORTABILITY=      -DSPEC_CPU_LINUX_IA32

403.gcc=default:
EXTRA_CFLAGS=      -Dalloca=_alloca

462.libquantum=default:
CPORTABILITY=      -DSPEC_CPU_LINUX

483.xalancbmk=default:
CXXPORTABILITY=    -DSPEC_CPU_LINUX

fp=default:
PORTABILITY = -DSPEC_CPU_LP64

435.gromacs=default=default=default:
LDPORTABILITY = -nofor_main

436.cactusADM=default=default=default:
LDPORTABILITY = -nofor_main

454.calculix=default=default=default:
LDPORTABILITY = -nofor_main

481.wrf=default=default=default:
CPORTABILITY = -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX

# Tuning Flags
#####

```



```

#
# Base tuning default optimization
# Feedback directed optimization not allowed in baseline for CPU2006
# However there is no limit on the number of flags as long as the same
# flags are used in the same order for all benchmarks of a given language

471.omnetpp,473.astar,483.xalancbmk=default:
EXTRA_LIBS= -L$(SMARTHEAP_DIR) -lsmarheap
EXTRA_LDFLAGS= -Wl,-z,muldefs

int=base=default=default:
COPTIMIZE= $(FAST) -inline-calloc -opt-malloc-options=3 -opt-prefetch
CXXOPTIMIZE= $(FASTNOSTATIC) -opt-prefetch

fp=base=default=default:
OPTIMIZE= $(FAST)

#####
# Peak Tuning Flags int 2006 fast
#####
int=peak=default:
COPTIMIZE= -opt-prefetch
CXXOPTIMIZE= -opt-prefetch
PASS1_CFLAGS = -prof-gen
PASS2_CFLAGS = $(FAST) -prof-use
PASS1_CXXFLAGS = -prof-gen
PASS2_CXXFLAGS = $(FASTNOSTATIC) -prof-use
PASS1_LDCFLAGS = -prof-gen
PASS2_LDCFLAGS = $(FAST) -prof-use
PASS1_LDCXXFLAGS = -prof-gen
PASS2_LDCXXFLAGS = $(FASTNOSTATIC) -prof-use

400.perlbench=peak=default:
COPTIMIZE= -ansi-alias -opt-prefetch

401.bzip2=peak=default:
CC= /opt/intel/Compiler/11.0/080/bin/intel64/icc
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE= -opt-prefetch -ansi-alias -auto-ilp32

403.gcc=peak=default:
COPTIMIZE = $(FAST) -inline-calloc -opt-malloc-options=3
feedback=0

429.mcf=peak=default:
COPTIMIZE= -opt-prefetch
#####
#####
%ifdef %{up-nhm}
copies=4
%endif
%ifdef %{dp-nhm}
copies=8
%endif
#####
#####

445.gobmk=peak=default:
COPTIMIZE= -O2 -ipo -no-prec-div -ansi-alias
PASS1_CFLAGS = -prof-gen
PASS2_CFLAGS = $(SSE) -prof-use
PASS1_LDCFLAGS = -prof-gen
PASS2_LDCFLAGS = $(SSE) -prof-use

456.hmmmer=peak=default:
CC= /opt/intel/Compiler/11.0/080/bin/intel64/icc
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE= $(FAST) -unroll2 -ansi-alias -auto-ilp32
feedback=no

```

```

458.sjeng=peak=default:
CC= /opt/intel/Compiler/11.0/080/bin/intel64/icc
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE= -unroll4 -auto-ilp32

462.libquantum=peak=default:
COPTIMIZE= $(FAST) -opt-malloc-options=3 -opt-prefetch
feedback=no

464.h264ref=peak=default:
COPTIMIZE= -unroll2 -ansi-alias

471.omnetpp=peak=default:
basepeak=yes

473.astar=peak=default:
CXX= /opt/intel/Compiler/11.0/080/bin/intel64/icpc
CXXPORTABILITY= -DSPEC_CPU_LP64
EXTRA_LIBS= -L$(SMARTHEAP_DIR) -lsmartheap64
CXXOPTIMIZE= -ansi-alias -opt-ra-region-strategy=routine -auto-ilp32

483.xalancbmk=peak=default:
basepeak=yes

#####
# Peak Tuning Flags for FP
#####
fp=peak=default:
COPTIMIZE= -auto-ilp32
CXXOPTIMIZE= -auto-ilp32
PASS1_CFLAGS = -prof-gen
PASS2_CFLAGS = $(FAST) -prof-use
PASS1_CXXFLAGS = -prof-gen
PASS2_CXXFLAGS = $(FAST) -prof-use
PASS1_FFLAGS = -prof-gen
PASS2_FFLAGS = $(FAST) -prof-use
PASS1_LDFLAGS = -prof-gen
PASS2_LDFLAGS = $(FAST) -prof-use

410.bwaves=peak=default:
OPTIMIZE= $(FAST) -opt-prefetch
feedback=0
#####
#####
#ifdef %{up-nhm}
copies=4
#endif
#ifdef %{dp-nhm}
copies=8
#endif
#####
#####

416.gamess=peak=default:
OPTIMIZE= -unroll2 -Ob0 -ansi-alias -scalar-rep-

433.milc=peak=default:
OPTIMIZE= -fno-alias
COPTIMIZE=

435.gromacs=peak=default:
OPTIMIZE= -opt-prefetch

436.cactusADM=peak=default:
OPTIMIZE= -unroll2 -opt-prefetch

437.leslie3d=peak=default:
PORTABILITY =
FC= ifort -m32
OPTIMIZE= -opt-malloc-options=3 -opt-prefetch

```

```

444.namd=peak=default:
CXXOPTIMIZE= -fno-alias -auto-ilp32

447.dealII=peak=default:
CXXOPTIMIZE= -unroll2 -ansi-alias -scalar-rep-

450.soplex=peak=default:
PORTABILITY =
CXX= icpc -m32
OPTIMIZE= -opt-malloc-options=3
CXXOPTIMIZE=
#####
#####
#ifdef %{up-nhm}
copies=4
#endif
#ifdef %{dp-nhm}
copies=8
#endif
#####
#####

453.povray=peak=default:
CXXOPTIMIZE= -unroll4 -ansi-alias

454.calculix=peak=default:
OPTIMIZE= $(FAST)
feedback=0

459.GemsFDTD=peak=default:
OPTIMIZE= -unroll2 -Ob0 -opt-prefetch

465.tonto=peak=default:
OPTIMIZE= -unroll4 -auto

470.lbm=peak=default:
OPTIMIZE= $(FAST) -opt-prefetch
feedback=no
#####
#####
#ifdef %{up-nhm}
copies=4
#endif
#ifdef %{dp-nhm}
copies=8
#endif
#####
#####

481.wrf=peak=default:
basepeak=yes

482.sphinx3=peak=default:
PORTABILITY =
CC= icc -m32
OPTIMIZE= $(FAST)
COPTIMIZE= -unroll2
feedback=no

#####
# (Edit this to match your system)
#####

default=default=default=default:
license_num      = 3184
test_sponsor     = Intel Corporation
hw_avail        = Feb-2009
sw_avail        = Feb-2009
tester          = Principled Technologies, Inc.

```

```

hw_cpu_name      = Intel Xeon X5570
hw_cpu_char     = 1600MHz system bus
hw_cpu_mhz     = 2930
hw_disk        = 1 x 160 GB 7200 RPM SATA
hw_fpu         = Integrated
hw_memory      = 24 GB (6 x 4 GB DDR3-10600)
hw_model       = Supermicro SuperServer
hw_ncpuorder   = 1,2 chip
hw_ncores     = 8
hw_nchips     = 2
hw_ncoresperchip = 4
hw_nthreadspercore = 2
hw_other      = None
hw_pcache    = 32 KB I + 32 KB D on chip per core
hw_scache    = 256 KB I+D on chip per core
hw_tcache    = 8 MB
hw_ocache    = None
hw_vendor    = Supermicro Computers, Inc.
prepared_by  = Principled Technologies, Inc.
sw_file      = ReiserFS
sw_os        = SuSe Linux SLES10 SP2
sw_state     = Run level 3 (multi-user)
notes_submit_000 = numactl was used to bind copies to the cores

```

```

int=default=default=default:
sw_compiler001 = Intel C++ Compiler 11.0 for Linux
sw_compiler002 = Build 20090131 Package ID: l_cproc_p_11.0.080
sw_base_ptrsize = 32-bit
sw_peak_ptrsize = 32/64-bit
sw_other001    = Microquill SmartHeap V8.1
sw_other002    = Binutils 2.18.50.0.7.20080502

```

```

fp=default=default=default:
sw_compiler001 = Intel C++ and Fortran Compiler 11.0 for Linux
sw_compiler002 = Build 20090131 Package ID: l_cproc_p_11.0.080, l_cprof_p_11.0.080
sw_base_ptrsize = 64-bit
sw_peak_ptrsize = 32/64-bit
sw_other001    = Binutils 2.18.50.0.7.20080502

```

SUSE Linux Enterprise Server 10: Intel Xeon processor E5472-based server

```

# Invocation command line:
# /usr/cpu2006/bin/runspec --rate 8 -c cpu2006.1.1.ic11.0.linux64.dgt.rate.cfg --reportable --define
stoakleydp8cores -T all --flagsurl=Intel-ic11.0-fp-linux64-revA.xml,Intel-Linux64-Platform.xml -o asc fp
# output_root was not used for this run
#####
#####
# This is a sample config file. It was tested with:
#
#   Compiler name/version:      Intel Compiler 11.0
#   Operating system version:   64-Bit SUSE LINUX Enterprise Server 10 or later
#   Hardware:                   Intel Core 2 and compatible Intel processors
#                               supporting Intel 64 and SSE4.1
#
#####
# SPEC CPU2006 Intel Linux64 config file
# July 2008 Intel Compiler 11.0 for Linux64
#####
action      = validate
tune        = base
ext         = cpu2006.1.1.ic11.0.linux64.dgt.rate
PATHSEP     = /
check_md5=1
reportable=1

#
# These are listed as benchmark-tuning-extension-machine
#
default=default=default=default:
CC = icc

```

```

CXX = icpc
FC=ifort
OBJ = .o
SMARTHEAP_DIR = /usr/cpu2006/SmartHeap_8.1/lib

submit= MYMASK=`printf '0x%x' \${(1<<\$SPECCOPYNUM)}`; taskset \${MYMASK} $command

#####
# Compiler options
# for Dunnington use -xSSE4.1
# for processors prior to dunnington, replace -xSSE4.1 with -xSSSE3
#####

SSE          = -xSSE4.1
FAST         = $(SSE) -ipo -O3 -no-prec-div -static
FASTNOSTATIC = $(SSE) -ipo -O3 -no-prec-div

#####
#
# portability & libraries
#
##### Portability Flags and Notes #####

400.perlbench=default:
CPORTABILITY=      -DSPEC_CPU_LINUX_IA32

403.gcc=default:
EXTRA_CFLAGS=      -Dalloca=_alloca

462.libquantum=default:
CPORTABILITY=      -DSPEC_CPU_LINUX

483.xalancbmk=default:
CXXPORTABILITY=    -DSPEC_CPU_LINUX

fp=default:
PORTABILITY = -DSPEC_CPU_LP64

435.gromacs=default=default=default:
LDPORTABILITY = -nofor_main

436.cactusADM=default=default=default:
LDPORTABILITY = -nofor_main

454.calculix=default=default=default:
LDPORTABILITY = -nofor_main

481.wrf=default=default=default:
CPORTABILITY = -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX

# Tuning Flags
#####

#
# Base tuning default optimization
# Feedback directed optimization not allowed in baseline for CPU2006
# However there is no limit on the number of flags as long as the same
# flags are used in the same order for all benchmarks of a given language

471.omnetpp,473.astar,483.xalancbmk=default:
EXTRA_LIBS=  -L$(SMARTHEAP_DIR) -lsmartheap
EXTRA_LDFLAGS= -Wl,-z,muldefs

int=base=default=default:
COPTIMIZE=   $(FAST) -inline-alloc -opt-malloc-options=3 -opt-prefetch
CXXOPTIMIZE= $(FASTNOSTATIC) -opt-prefetch

fp=base=default=default:

```

```

OPTIMIZE= $(FAST) -opt-prefetch

#####
# Peak Tuning Flags int 2006 fast
#####
int=peak=default:
COPTIMIZE= $(FAST) -opt-prefetch
CXXOPTIMIZE= $(FASTNOSTATIC) -opt-prefetch
PASS1_CFLAGS = -prof-gen
PASS2_CFLAGS = -prof-use
PASS1_CXXFLAGS = -prof-gen
PASS2_CXXFLAGS = -prof-use
PASS1_LDFLAGS = -prof-gen
PASS2_LDFLAGS = -prof-use

400.perlbench=peak=default:
COPTIMIZE= $(FAST) -ansi-alias -opt-prefetch

401.bzip2=peak=default:
CC= /opt/intel/Compiler/11.0/042/bin/intel64/icc -L/opt/intel/Compiler/11.0/042/ipp/em64t/lib -
I/opt/intel/Compiler/11.0/042/ipp/em64t/include
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE= $(FAST) -opt-prefetch -ansi-alias

403.gcc=peak=default:
COPTIMIZE = $(FAST) -inline-alloc -opt-malloc-options=3
feedback=0

429.mcf=peak=default:
COPTIMIZE= $(FAST) -opt-prefetch

445.gobmk=peak=default:
COPTIMIZE= $(SSE) -O2 -ipo -no-prec-div -ansi-alias

456.hmmmer=peak=default:
CC= /opt/intel/Compiler/11.0/042/bin/intel64/icc -L/opt/intel/Compiler/11.0/042/ipp/em64t/lib -
I/opt/intel/Compiler/11.0/042/ipp/em64t/include
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE= $(FAST) -unroll2 -ansi-alias
feedback=no

458.sjeng=peak=default:
COPTIMIZE= $(FAST) -unroll4

462.libquantum=peak=default:
COPTIMIZE= $(FAST) -opt-malloc-options=3 -parallel -par-runtime-control -opt-prefetch
feedback=no
copies=1
submit=

464.h264ref=peak=default:
COPTIMIZE= $(FAST) -unroll2 -ansi-alias

471.omnetpp=peak=default:
CXXOPTIMIZE= $(FASTNOSTATIC) -ansi-alias -opt-ra-region-strategy=block

473.astar=peak=default:
CXXOPTIMIZE= $(FASTNOSTATIC) -ansi-alias -opt-ra-region-strategy=routine

483.xalancbmk=peak=default:
basepeak=yes

#####
# Peak Tuning Flags for FP
#####
fp=peak=default:
OPTIMIZE= $(FAST)
COPTIMIZE= -auto-ilp32
CXXOPTIMIZE= -auto-ilp32
PASS1_CFLAGS = -prof-gen

```



```

PASS2_CFLAGS = -prof-use
PASS1_CXXFLAGS = -prof-gen
PASS2_CXXFLAGS = -prof-use
PASS1_FFLAGS = -prof-gen
PASS2_FFLAGS = -prof-use
PASS1_LDFLAGS = -prof-gen
PASS2_LDFLAGS = -prof-use

410.bwaves=peak=default:
OPTIMIZE= $(FAST) -opt-prefetch
feedback=0
#####
#####
%ifdef %{stoakleydp8cores}
copies=4
submit= if `test $$SPECCOPYNUM -le 1`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 4` $command ; fi
%endif
#####
#####

416.gamess=peak=default:
OPTIMIZE= $(FAST) -unroll2 -Ob0 -ansi-alias -scalar-rep-

433.milc=peak=default:
OPTIMIZE= $(FAST) -fno-alias
COPTIMIZE=

435.gromacs=peak=default:
OPTIMIZE= $(FAST) -opt-prefetch

436.cactusADM=peak=default:
OPTIMIZE= $(FAST) -unroll2 -opt-prefetch -parallel
copies=1
submit=

437.leslie3d=peak=default:
PORTABILITY =
FC= /opt/intel/Compiler/11.0/042/bin/ia32/ifort -L/opt/intel/Compiler/11.0/042/ipp/ia32/lib -
I/opt/intel/Compiler/11.0/042/ipp/ia32/include
OPTIMIZE= $(FAST) -opt-malloc-options=3 -opt-prefetch
#####
#####
%ifdef %{stoakleydp8cores}
copies=4
submit= if `test $$SPECCOPYNUM -le 1`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 4` $command ; fi
%endif

%ifdef %{yorkfield}
copies=2
submit= if `test $$SPECCOPYNUM -le 0`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 2` $command ; fi
%endif

%ifdef %{wolfdale}
copies=1
submit= if `test $$SPECCOPYNUM -le 0`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 2` $command ; fi
%endif

#####
#####

444.namd=peak=default:
CXXOPTIMIZE= $(FAST) -fno-alias -auto-ilp32

447.dealII=peak=default:
CXXOPTIMIZE= $(FAST) -unroll2 -ansi-alias -scalar-rep-

```

```

450.soplex=peak=default:
PORTABILITY =
CXX= /opt/intel/Compiler/11.0/042/bin/ia32/icpc -L/opt/intel/Compiler/11.0/042/ipp/ia32/lib -
I/opt/intel/Compiler/11.0/042/ipp/ia32/include
OPTIMIZE= $(FAST) -opt-malloc-options=3
CXXOPTIMIZE=

453.povray=peak=default:
CXXOPTIMIZE= $(FAST) -unroll4 -ansi-alias

454.calculix=peak=default:
OPTIMIZE= $(FAST)
feedback=0

459.GemsFDTD=peak=default:
OPTIMIZE= $(FAST) -unroll2 -Ob0 -opt-prefetch

465.tonto=peak=default:
OPTIMIZE= $(FAST) -unroll4 -auto

470.lbm=peak=default:
OPTIMIZE= $(FAST) -opt-prefetch
feedback=no

#####
#####
%ifdef %{bensleydp8cores}
copies=2
submit= if `test $$SPECCOPYNUM -le 0`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 4` $command ; fi
%endif

%ifdef %{stoakleydp8cores}
copies=4
submit= if `test $$SPECCOPYNUM -le 1`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 4` $command ; fi
%endif

%ifdef %{tgt4p16cores}
copies=8
submit= if `test $$SPECCOPYNUM -le 3`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 8` $command ; fi
%endif

%ifdef %{dgt4p24cores}
copies=12
submit= $[top]/mysubmit.pl $$SPECCOPYNUM "$command"
%endif

%ifdef %{dgt4p16cores}
copies=8
submit= $[top]/mysubmit.pl $$SPECCOPYNUM "$command"
%endif

%ifdef %{yorkfield}
copies=2
submit= if `test $$SPECCOPYNUM -le 0`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 2` $command ; fi
%endif

%ifdef %{wolfdale}
copies=1
submit= if `test $$SPECCOPYNUM -le 0`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 2` $command ; fi
%endif

#####
#####

481.wrf=peak=default:

```

```

basepeak=yes

482.sphinx3=peak=default:
PORTABILITY =
CC= /opt/intel/Compiler/11.0/042/bin/ia32/icc -L/opt/intel/Compiler/11.0/042/ipp/ia32/lib -
I/opt/intel/Compiler/11.0/042/ipp/ia32/include
COPTIMIZE= -unroll2
feedback=no

#####
#####
%ifdef %{stoakleydp8cores}
copies=4
submit= if `test $$SPECCOPYNUM -le 1`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 4` $command ; fi
%endif

%ifdef %{tgt4p16cores}
copies=8
submit= if `test $$SPECCOPYNUM -le 3`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 8` $command ; fi
%endif

%ifdef %{dgt4p24cores}
copies=12
submit= ${top}/mysubmit.pl $$SPECCOPYNUM "$command"
%endif

%ifdef %{dgt4p16cores}
copies=8
submit= ${top}/mysubmit.pl $$SPECCOPYNUM "$command"
%endif

%ifdef %{yorkfield}
copies=2
submit= if `test $$SPECCOPYNUM -le 0`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 2` $command ; fi
%endif

%ifdef %{wolfdale}
copies=1
submit= if `test $$SPECCOPYNUM -le 0`; then taskset -c $$SPECCOPYNUM $command ; else taskset -c `expr
$$SPECCOPYNUM + 2` $command ; fi
%endif

#####
#####

#####
# (Edit this to match your system)
#####

default=default=default=default:
license_num      = 3184
test_sponsor     = Intel Corporation
hw_avail        = Nov-2008
sw_avail        = Jan-2009
tester          = Principled Technologies Inc.
hw_cpu_name     = Intel Xeon E5472
hw_cpu_char     = 1600MHz system bus
hw_cpu_mhz      = 3000
hw_disk         = 1 x 250 GB SATA, 7200 RPM
hw_fpu          = Integrated
hw_memory       = 16 GB (8 x 2 GB DDR2-6400F)

```

```

hw_model          =
hw_ncpuorder     = 1,2 chips
hw_ncores        = 8
hw_nchips        = 2
hw_ncoresperchip = 4
hw_nthreadspercore = 1
hw_other         = None
hw_pcache        = 32 KB I + 32 KB D on chip per core
hw_scache        = 12 MB I+D on chip per chip, 6 MB shared / 2 cores
hw_tcache        = None
hw_ocache        = None
hw_vendor        = Supermicro Computer, Inc.
prepared_by      = Principled Technologies, Inc.
sw_file          = ReiserFS
sw_os000         = SuSE Linux Enterprise Server 10 (x86_64) SP2,
sw_os001         = Kernel 2.6.16.61-0.12-smp
sw_state         = Run level 3 (multi-user)
sw_other000      = Binutils 2.19

int=default=default=default:
sw_compiler001   = Intel C++ Compiler 11.0 for Linux
sw_compiler002   = Build 20080730 Package ID: l_cc_b_11.0.074
sw_base_ptrsize  = 32-bit
sw_peak_ptrsize  = 32/64-bit
notes_020        = All benchmarks compiled in 32-bit mode except 401.bzip2 and 456.hmmmer,
notes_025        = for peak, are compiled in 64-bit mode
notes_030        = taskset was used to bind processes to cores except
notes_035        = for 462.libquantum peak
notes_040        = Hardware Sector Prefetch Enable and Adjacent Sector Prefetch Disable
notes_045        = OMP_NUM_THREADS set to number of processors
notes_050        = KMP_AFFINITY set to "physical,0"
notes_055        = KMP_STACKSIZE set to 64M

fp=default=default=default:
sw_compiler000   = Intel C++ and Fortran Compiler 11.0 for Linux
sw_compiler001   = Build 20080730 Package ID: l_cproc_b_11.0.074,
sw_compiler002   = l_fproc_b_11.0.074
sw_base_ptrsize  = 64-bit
sw_peak_ptrsize  = 32/64-bit
notes_000        = OMP_NUM_THREADS set to number of processors
notes_005        = KMP_AFFINITY set to "physical,0"
notes_010        = KMP_STACKSIZE set to 64M
notes_015        = Hardware Prefetch Enabled and Adjacent Sector Prefetch Disabled
notes_020        = 'ulimit -s unlimited' was used to set the stack size to unlimited prior to run

# The following section was added automatically, and contains settings that
# did not appear in the original configuration file, but were added to the
# raw file after the run.
default:
flagsurl000 = http://www.spec.org/cpu2006/flags/Intel-ic11.0-fp-linux64-revA.20081126.00.xml
notes_submit_000 = taskset was used to bind processes to cores except for 436.cactusADM peak

```

SUSE Linux Enterprise Server 10: Intel Xeon processor 5160-based server

```

# Invocation command line:
# /usr/cpu2006/bin/runspec --rate 4 -c cpu2006.1.0.ic10.1.mainline20070725.linux64.rate.cfg -T base -o
asc fp
# output_root was not used for this run
#####
#####
# This is a sample config file. It was tested with:
#
#   Compiler name/version:      Intel Compiler 10.1 Mainline
#   Operating system version:   64-Bit SUSE LINUX Enterprise Server 10 or later
#   Hardware:                   Intel Core 2 and compatible Intel processors
#                               supporting Intel 64 and SSSE3
#

```

```

#####
# SPEC CPU2006 Intel Linux64 config file
# July 11 2007 Intel Compiler 10.1 for Linux64
#####
action      = validate
tune        = base
ext         = cpu2006.1.0.ic10.1.mainline20070725.linux64.rate
PATHSEP     = /
check_md5=1
reportable=1

#
# These are listed as benchmark-tuning-extension-machine
#
default=default=default=default:
CC = icc
CXX = icpc
FC=ifort
OBJ = .o
SMARTHEAP_DIR = /usr/cpu2006/SmartHeap_8.1/lib
sw_peak_ptrsize = 32/64-bit

int=default:
sw_base_ptrsize = 32-bit

fp=default:
sw_base_ptrsize = 64-bit

submit= MYMASK=`printf '0x%x' \${(1<<\$SPECCOPYNUM)}`; taskset \${MYMASK} $command

#####
#
# portability & libraries
#
##### Portability Flags and Notes #####

400.perlbench=default:
CPORTABILITY=      -DSPEC_CPU_LINUX_IA32

403.gcc=default:
EXTRA_CFLAGS=      -Dalloca=_alloca

462.libquantum=default:
CPORTABILITY=      -DSPEC_CPU_LINUX

483.xalancbmk=default:
CXXPORTABILITY=    -DSPEC_CPU_LINUX

fp=default:
PORTABILITY = -DSPEC_CPU_LP64

435.gromacs=default=default=default:
LDPORTABILITY = -nofor_main

436.cactusADM=default=default=default:
LDPORTABILITY = -nofor_main

454.calculix=default=default=default:
LDPORTABILITY = -nofor_main

481.wrf=default=default=default:
CPORTABILITY = -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX

# Tuning Flags
#####

#
# Base tuning default optimization

```

```

# Feedback directed optimization not allowed in baseline for CPU2006
# However there is no limit on the number of flags as long as the same
# flags are used in the same order for all benchmarks of a given language

471.omnetpp,473.astar,483.xalancbmk=default:
EXTRA_LIBS= -L$(SMARTHEAP_DIR) -lsmartheap
EXTRA_LDFLAGS= -Wl,-z,muldefs

int=base=default=default:
COPTIMIZE= -fast -inline-calloc -opt-malloc-options=3
CXXOPTIMIZE= -xT -ipo -O3 -no-prec-div

fp=base=default=default:
OPTIMIZE= -fast

#####
# Peak Tuning Flags int 2006 fast
#####
int=peak=default:
COPTIMIZE= -fast
CXXOPTIMIZE= -xT -ipo -O3 -no-prec-div
PASS1_CFLAGS = -prof-gen
PASS2_CFLAGS = -prof-use
PASS1_CXXFLAGS = -prof-gen
PASS2_CXXFLAGS = -prof-use
PASS1_LDFLAGS = -prof-gen
PASS2_LDFLAGS = -prof-use

400.perlbench=peak=default:
COPTIMIZE= -fast -ansi-alias -prefetch

401.bzip2=peak=default:
CC= /opt/intel/Compiler/11.0/074/bin/intel64/icc -L/opt/intel/Compiler/11.0/074/lib/intel64 -
I/opt/intel/Compiler/11.0/074/include/intel64
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE= -fast -prefetch

403.gcc=peak=default:
COPTIMIZE = -fast -inline-calloc -opt-malloc-options=3
feedback=0

429.mcf=peak=default:
COPTIMIZE= -fast -prefetch
feedback=0

445.gobmk=peak=default:
COPTIMIZE= -xT -O2 -ipo -no-prec-div -ansi-alias

456.hmmer=peak=default:
CC= /opt/intel/Compiler/11.0/074/bin/intel64/icc -L/opt/intel/Compiler/11.0/074/lib/intel64 -
I/opt/intel/Compiler/11.0/074/include/intel64
CPORTABILITY= -DSPEC_CPU_LP64
COPTIMIZE= -fast -unroll2 -ansi-alias -opt-multi-version-aggressive
feedback=no

458.sjeng=peak=default:
COPTIMIZE= -fast -unroll4

462.libquantum=peak=default:
COPTIMIZE= -fast -unroll4 -Ob0 -prefetch -opt-streaming-stores always -vec-guard-write -opt-malloc-
options=3 -parallel -par-runtime-control
feedback=no
copies=1

464.h264ref=peak=default:
COPTIMIZE= -fast -unroll2 -ansi-alias

471.omnetpp=peak=default:
CXXOPTIMIZE= -xT -O3 -ipo -no-prec-div -ansi-alias -opt-ra-region-strategy=block

```

```

473.astar=peak=default:
CXXOPTIMIZE= -xT -O3 -ipo -no-prec-div -ansi-alias -opt-ra-region-strategy=routine

483.xalancbmk=peak=default:
basepeak=yes

#####
# Peak Tuning Flags for FP
#####
fp=peak=default:
OPTIMIZE= -fast
COPTIMIZE= -auto-ilp32
CXXOPTIMIZE= -auto-ilp32
PASS1_CFLAGS = -prof-gen
PASS2_CFLAGS = -prof-use
PASS1_CXXFLAGS = -prof-gen
PASS2_CXXFLAGS = -prof-use
PASS1_FFLAGS = -prof-gen
PASS2_FFLAGS = -prof-use
PASS1_LDFLAGS = -prof-gen
PASS2_LDFLAGS = -prof-use

410.bwaves=peak=default:
OPTIMIZE= -fast -prefetch
feedback=0

416.gamess=peak=default:
OPTIMIZE= -fast -unroll2 -Ob0 -ansi-alias -scalar-rep-

433.milc=peak=default:
OPTIMIZE= -fast -fno-alias

435.gromacs=peak=default:
OPTIMIZE= -fast -prefetch

436.cactusADM=peak=default:
OPTIMIZE= -fast -unroll2 -prefetch

437.leslie3d=peak=default:
PORTABILITY =
FC= /home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/bin/ifort -
L/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/lib -
I/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/include
OPTIMIZE= -fast -prefetch -opt-malloc-options=3

444.namd=peak=default:
CXXOPTIMIZE= -fast -fno-alias -auto-ilp32

447.dealII=peak=default:
CXXOPTIMIZE= -fast -unroll2 -ansi-alias -scalar-rep-

450.soplex=peak=default:
PORTABILITY =
CXX= /home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/bin/icpc -
L/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/lib -
I/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/include
OPTIMIZE= -fast -opt-malloc-options=3
CXXOPTIMIZE=

453.povray=peak=default:
CXXOPTIMIZE= -fast -unroll4 -ansi-alias

454.calculix=peak=default:
OPTIMIZE= -fast -unroll-aggressive
feedback=0

459.GemsFDTD=peak=default:
OPTIMIZE= -fast -unroll2 -Ob0 -prefetch

465.tonto=peak=default:

```

```

OPTIMIZE= -fast -unroll4 -auto

470.lbm=peak=default:
PORTABILITY =
CC= /home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/bin/icc -
L/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/lib -
I/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/include
COPTIMIZE= -unroll2 -scalar-rep- -prefetch -opt-malloc-options=3

481.wrf=peak=default:
OPTIMIZE= -fast
feedback=0

482.sphinx3=peak=default:
PORTABILITY =
CC= /home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/bin/icc -
L/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/lib -
I/home/cmplr/usr3/alrahate/compilers/ic10.1mainline/20070725/Linux32/include
COPTIMIZE= -unroll2
feedback=no

#####
# (Edit this to match your system)
#####

default=default=default=default:
license_num      = 3184
test_sponsor     = Intel Corp.
hw_avail         = Jul-2008
sw_avail         = Jan-2009
test_date        = Mar-2009
tester           = Principled Technologies, Inc.
hw_cpu_name      = Intel Xeon 5160
hw_cpu_char      = 1333MHz system bus
hw_cpu_mhz       = 3000
hw_disk          = 1 x 160 GB SAS, 7200 RPM
hw_fpu           = Integrated
hw_memory        = 16 GB (8 x 2GB DDR2-5300F)
hw_model         = Supermicro SuperServer 6025B-TR+ (Intel Xeon 5160)
hw_ncpuorder     = 1,2 chips
hw_ncores        = 4
hw_nchips        = 2
hw_ncoresperchip = 2
hw_nthreadspercore = 1
hw_other         = None
sw_auto_parallel = No
hw_pcache        = 32 KB I + 32 KB D on chip per core
hw_scache        = 4 MB I+D on chip per chip
hw_tcache        = None
hw_ocache        = None
hw_vendor        = Supermicro Computer, Inc.
prepared_by      = Principled Technologies, Inc.
sw_file          = ReiserFS
sw_os            = SLES 10 (x86_64) SP2, 2.6.16-60.0.21-smp
sw_state         = Multi-user, run level 3
sw_other         = MicroQuill SmartHeap 8.1
int=default=default=default:
sw_compiler001   = Intel C++ Compiler for Linux32 and Linux64 version 11.0
sw_compiler002   = Build 20070725
sw_auto_parallel = No

fp=default=default=default:
sw_compiler000   = Intel C++ and Fortran Compiler for Linux32 and
sw_compiler001   = Linux64 version 11.0
sw_compiler002   = Build 20070725
sw_auto_parallel = No

```



```

# The following section was added automatically, and contains settings that
# did not appear in the original configuration file, but were added to the
# raw file after the run.
default:
flagsurl000= http://www.spec.org/cpu2006/flags/HP-Intel-ic10.1-linux-flags.20071002.xml
notes_plat_000 =BIOS configuration:
notes_plat_005 = Power Regulator set to Static High Performance Mode
notes_os_000 = 'ulimit -s unlimited' was used to set the stacksize to unlimited prior to run
notes_os_005 = '/usr/bin/taskset' used to bind processes to CPUs
notes_os_010 = KMP_AFFINITY set to physical,0
notes_os_015 = KMP_STACKSIZE set to 200M

```

SUSE Linux Enterprise Server 10: Intel Xeon processor 3.6 GHz-based server

```

# Invocation command line:
# /usr/cpu2006/bin/runspec -c cpu2006-ic91.em64t.cfg -r 4 -v 7 -T base fp
# output_root was not used for this run
#####
#####
# SPEC CPU2006 Intel Linux64 config file
# Feb 2009 Intel Compiler 9.1 for Linux64
#####

action          = validate
tune            = base
ext             = ic91.em64t
size           = ref
flagsurl000    = ic91-linux-flags.xml
output_format  = all

check_md5      = 1
mean_anyway   = 1
reportable    = 1
verbose       = 6

#####
# File to be included into config file for SPEC CPU2006

# This include file specifies the "System Under Test" (Hardware,
# OS, BIOS, etc.)
# Any information about the binaries is elsewhere.

# To avoid conflicts in the numbering of the notes,
# please use only 900 and higher numbers.

#####
# System information                                     #
# If some remarks about BIOS or Firmware are needed, place them here. #
#####

default=default=default=default:
notes_os_000 = 'ulimit -s unlimited' was used to set the stacksize to unlimited prior to run
notes_os_005 = '/usr/bin/taskset' used to bind processes to CPUs
notes_000    =
notes_005    = The system bus runs at 800 MHz
notes_010    =
notes_015    =

#####
# Description Hardware and Software #
#####

default=default=default=default:
hw_vendor      = Supermicro Computer, Inc.
hw_model000    = Supermicro 6024H-T, Intel Xeon processor,
hw_model001    = 3.6 GHz
hw_cpu_name    = Intel Xeon 3.6GHz

```

```

hw_cpu_char      = 800 MHz system bus, Hyperthreading Enabled
hw_cpu_mhz       = 3600
hw_fpu           = Integrated
#
hw_nchips        = 2
hw_ncores        = 2
hw_ncoresperchip = 1
hw_nthreadspercore = 2
#
hw_ncpuorder     = 1,2 chips
hw_pcache        = 12 K micro-ops I + 16 KB D on chip per chip
hw_scache        = 2 MB I+D on chip per chip
hw_tcache        = None
hw_ocache        = None
hw_memory        = 16 GB (8x2 GB DDR PC2700R)
hw_disk000       = Western Digital WD1600AAJS-11B4A0
hw_disk001 = (SATA, 160GB, 7200rpm)
hw_other         = None

sw_file          = ReiserFS
sw_state         = Multiuser, Runlevel 3

license_num      = 3184
test_sponsor     = Intel Corp.
tester           = Principled Technologies, Inc.
hw_avail         = Oct-2006
prepared_by      = Principled Technologies, Inc.

default=default=default=default:
CC = icc
CXX = icpc
FC = ifort
OBJ = .o

SMARTHEAP_DIR = /usr/cpu2006/SmartHeap_8.1/lib

submit= MYMASK=`printf '0x%x' \${(1<<\$SPECCOPYNUM)}\`; /usr/bin/taskset \$MYMASK $command

#####
# portability & libraries #
#####

fp=default=default=default:
PORTABILITY = -DSPEC_CPU_LP64

400.perlbench=default=default=default:
CPORTABILITY = -DSPEC_CPU_LINUX_X64

462.libquantum=default=default=default:
CPORTABILITY = -DSPEC_CPU_LINUX

483.xalancbmk=default=default=default:
CXXPORTABILITY = -DSPEC_CPU_LINUX

435.gromacs=default=default=default:
LDPORABILITY = -nofor_main

436.cactusADM=default=default=default:
LDPORABILITY = -nofor_main

454.calculix=default=default=default:
LDPORABILITY = -nofor_main

481.wrf=default=default=default:
CPORABILITY = -DSPEC_CPU_CASE_FLAG -DSPEC_CPU_LINUX

#####
# Baseline Tuning Flags #
#####

```

```

int=base=default=default:
COPTIMIZE= -fast
CXXOPTIMIZE= -xP -O3 -ipo -no-prec-div
EXTRA_CXXLIBS= -L$(SMARTHEAP_DIR) -lsmartheap

fp=base=default=default:
OPTIMIZE= -fast

#####
# Peak Tuning Flags #
#####

int=peak=default=default:
OPTIMIZE= -fast
EXTRA_LIBS= -L$(SMARTHEAP_DIR) -lsmartheap

PASS1_CFLAGS = -prof_gen
PASS2_CFLAGS = -prof_use
PASS1_CXXFLAGS = -prof_gen
PASS2_CXXFLAGS = -prof_use
PASS1_LDFLAGS = -prof_gen
PASS2_LDFLAGS = -prof_use

fp=peak=default=default:
OPTIMIZE= -fast

PASS1_CFLAGS = -prof_gen
PASS2_CFLAGS = -prof_use
PASS1_FFLAGS = -prof_gen
PASS2_FFLAGS = -prof_use
PASS1_CXXFLAGS = -prof_gen
PASS2_CXXFLAGS = -prof_use
PASS1_LDFLAGS = -prof_gen
PASS2_LDFLAGS = -prof_use

400.perlbench=peak=default=default:
EXTRA_LIBS=

401.bzip2=peak=default=default:
CC=/opt/intel/cce/9.1.053/bin/icc -I/opt/intel/cce/9.1.053/include -L/opt/intel/cce/9.1.053/lib
PORTABILITY=-DSPEC_CPU_LP64
EXTRA_LIBS=
feedback=0

403.gcc=peak=default=default:
basepeak=yes

456.hmmmer=peak=default=default:
CC=/opt/intel/cce/9.1.053/bin/icc -I/opt/intel/cce/9.1.053/include -L/opt/intel/cce/9.1.053/lib
PORTABILITY=-DSPEC_CPU_LP64
EXTRA_LIBS=

462.libquantum=peak=default=default:
CC=/opt/intel/cce/9.1.053/bin/icc -I/opt/intel/cce/9.1.053/include -L/opt/intel/cce/9.1.053/lib
PORTABILITY=-DSPEC_CPU_LP64
EXTRA_LIBS=

471.omnetpp=peak=default=default:
OPTIMIZE=-xP -O3 -ipo -no-prec-div

483.xalancbmk=peak=default=default:
basepeak=yes

410.bwaves=peak=default=default:
basepeak=yes

416.gamess=peak=default=default:
basepeak=yes

433.milc=peak=default=default:

```

```

PORTABILITY=
CC=/opt/intel/cc/9.1.052/bin/icc -I/opt/intel/cc/9.1.052/include -L/opt/intel/cc/9.1.052/lib

434.zeusmp=peak=default=default:
PORTABILITY=
FC=/opt/intel/fc/9.1.052/bin/ifort -I/opt/intel/fc/9.1.052/include -L/opt/intel/fc/9.1.052/lib
feedback=0

436.cactusADM=peak=default=default:
basepeak=yes

437.leslie3d=peak=default=default:
basepeak=yes

444.namd=peak=default=default:
basepeak=yes

450.soplex=peak=default=default:
PORTABILITY=
CXX=/opt/intel/cc/9.1.052/bin/icpc -I/opt/intel/cc/9.1.052/include -L/opt/intel/cc/9.1.052/lib

459.GemsFDTD=peak=default=default:
basepeak=yes

470.lbm=peak=default=default:
PORTABILITY=
CC=/opt/intel/cc/9.1.052/bin/icc -I/opt/intel/cc/9.1.052/include -L/opt/intel/cc/9.1.052/lib

481.wrf=peak=default=default:
basepeak=yes

482.sphinx3=peak=default=default:
PORTABILITY=
CC=/opt/intel/cc/9.1.052/bin/icc -I/opt/intel/cc/9.1.052/include -L/opt/intel/cc/9.1.052/lib
feedback=0

#####
# Used Compilers and OS #
#####

int=default=default=default:
sw_compiler000 = Intel C++ Compiler for IA32/EM64T application,
sw_compiler001 = Version 9.1 - Build 20080314,
sw_compiler002 = Package-ID: l_cc_c_9.1.053
sw_other      = Smart Heap Library, Version 8.1
sw_base_ptrsize = 32-bit
sw_peak_ptrsize = 32/64-bit

fp=default=default=default:
sw_compiler000 = Intel C++ Compiler for IA32/EM64T applications
sw_compiler001 = Version 9.1 - Build 20071016,
sw_compiler002 = Package-ID: l_cc_c_9.1.052
sw_compiler003 = Intel Fortran Compiler for IA32/EM64T applications
sw_compiler004 = Version 9.1 - Build 20071016,
sw_compiler005 = Package ID: l_fc_c_9.1.052
sw_other      = Smart Heap Library, Version 8.1
sw_base_ptrsize = 64-bit
sw_peak_ptrsize = 32/64-bit

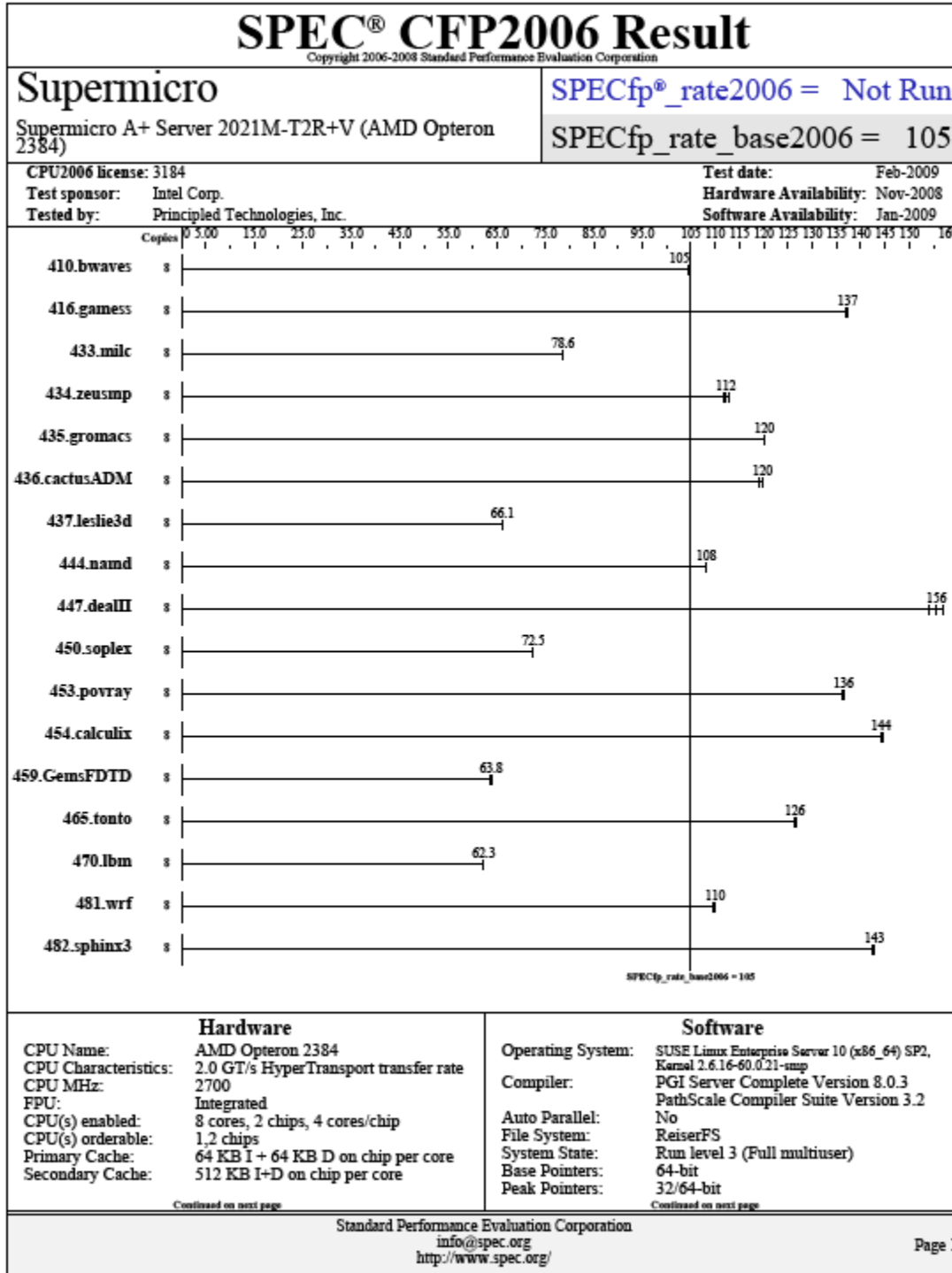
default=default=default=default:
sw_os000      = SUSE Linux Enterprise Server 10 (x86_64) SP2,
sw_os001      = Kernel 2.6.16-60.0.21-smp
sw_avail      = Nov-2007

#####
# End of config-file #
#####

```

Appendix C – SPECfp_rate_base2006 output

This appendix provides the output of the benchmark for each of the test servers.
SUSE Linux Enterprise Server 10: AMD Opteron 2384-based server



SPEC CFP2006 Result

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Supermicro

Supermicro A+ Server 2021M-T2R+V (AMD Opteron 2384)

SPECfp_rate2006 = Not Run

SPECfp_rate_base2006 = 105

CPU2006 license: 3184

Test sponsor: Intel Corp.

Tested by: Principled Technologies, Inc.

Test date: Feb-2009

Hardware Availability: Nov-2008

Software Availability: Jan-2009

Hardware (Continued)

L3 Cache: 6 MB I+D on chip per chip
 Other Cache: None
 Memory: 32 GB (8x4 GB, DDR2 PC2-6400)
 Disk Subsystem: 1 x 160 GB SATA, 7200 RPM
 Other Hardware: None

Software (Continued)

Other Software: Microquill SmartHeap V8.1
 Binutils 2.19
 32-bit and 64-bit libbugetlibfs libraries

Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	8	1039	105	1039	105	<u>1039</u>	<u>105</u>									
416.gamess	8	<u>1141</u>	<u>137</u>	1141	137	1144	137									
433.milc	8	<u>935</u>	<u>78.6</u>	935	78.5	935	78.6									
434.zeusmp	8	652	112	645	113	<u>649</u>	<u>112</u>									
435.gromacs	8	<u>476</u>	<u>120</u>	476	120	476	120									
436.cactusADM	8	804	119	<u>798</u>	<u>120</u>	797	120									
437.leslie3d	8	1136	66.2	<u>1138</u>	<u>66.1</u>	1138	66.1									
444.namd	8	593	108	594	108	<u>593</u>	<u>108</u>									
447.dealII	8	593	154	<u>588</u>	<u>156</u>	584	157									
450.soplex	8	922	72.4	921	72.5	<u>921</u>	<u>72.5</u>									
453.povray	8	313	136	312	137	<u>312</u>	<u>136</u>									
454.calculix	8	<u>458</u>	<u>144</u>	457	144	458	144									
459.GemsFDTD	8	1326	64.0	<u>1331</u>	<u>63.8</u>	1331	63.8									
465.tonto	8	623	126	<u>623</u>	<u>126</u>	621	127									
470.libm	8	1766	62.3	<u>1765</u>	<u>62.3</u>	1765	62.3									
481.wrf	8	815	110	812	110	<u>812</u>	<u>110</u>									
482.sphinx3	8	<u>1092</u>	<u>143</u>	1091	143	1094	142									

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.
 taskset was used to bind processes to cores except
 for 436.cactusADM peak
 OMP_NUM_THREADS set to number of processors
 KMP_AFFINITY set to "physical,0"
 KMP_STACKSIZE set to 64M

Base Compiler Invocation

C benchmarks:
 pgcc

Continued on next page

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SPEC CFP2006 Result

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Supermicro

Supermicro A+ Server 2021M-T2R+V (AMD Opteron 2384)

SPECfp_rate2006 = Not Run

SPECfp_rate_base2006 = 105

CPU2006 license: 3184

Test sponsor: Intel Corp.

Tested by: Principled Technologies, Inc.

Test date: Feb-2009

Hardware Availability: Nov-2008

Software Availability: Jan-2009

Base Compiler Invocation (Continued)

C++ benchmarks:

pgcpp

Fortran benchmarks:

pgf95

Benchmarks using both Fortran and C:

pgcc pgf95

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 -Mnomain
436.cactusADM: -DSPEC_CPU_LP64 -Mnomain
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 -Mnomain
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:

```
-Mvect-cachesize:6291456 -fastsse -Msmartalloc-huge -Mfprelaxed
-Mipa-fast -Mipa-inline -tp barcelona-64 -Bstatic_pgi
```

C++ benchmarks:

```
-Mvect-cachesize:6291456 -fastsse -Msmartalloc-huge -Mfprelaxed
--zc_eh -Mipa-fast -Mipa-inline -tp barcelona-64 -Bstatic_pgi
```

Fortran benchmarks:

```
-Mvect-cachesize:6291456 -fastsse -Mfprelaxed -Msmartalloc-huge
-Mipa-fast -Mipa-inline -tp barcelona-64 -Bstatic_pgi
```

Benchmarks using both Fortran and C:

```
-Mvect-cachesize:6291456 -fastsse -Msmartalloc-huge -Mfprelaxed
-Mipa-fast -Mipa-inline -tp barcelona-64 -Bstatic_pgi
```

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SPEC CFP2006 Result

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Supermicro

Supermicro A+ Server 2021M-T2R+V (AMD Opteron 2384)

SPECfp_rate2006 = Not Run

SPECfp_rate_base2006 = 105

CPU2006 license: 3184

Test sponsor: Intel Corp.

Tested by: Principled Technologies, Inc.

Test date: Feb-2009

Hardware Availability: Nov-2008

Software Availability: Jan-2009

Base Other Flags

C benchmarks:

-M1pa-jobs:4

C++ benchmarks:

-M1pa-jobs:4

Fortran benchmarks:

-M1pa-jobs:4

Benchmarks using both Fortran and C:

-M1pa-jobs:4

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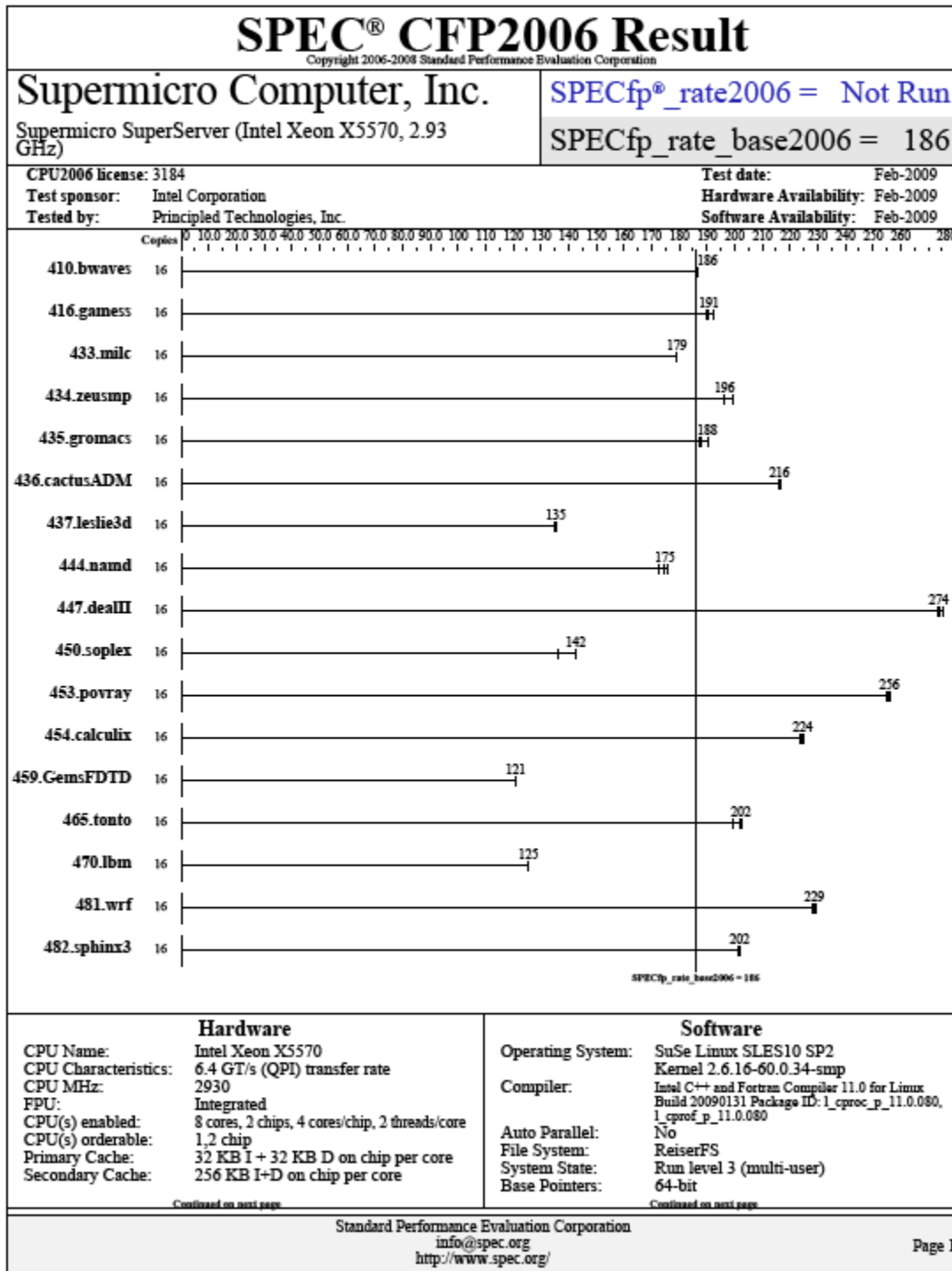
For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC CPU2006 v1.1.
Report generated on Mon Mar 9 07:48:00 2009 by SPEC CPU2006 PS/PDF formatter v6128.

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SUSE Linux Enterprise Server 10: Intel Xeon processor X5570-based server



SPEC CFP2006 Result

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Supermicro Computer, Inc.

SPECfp_rate2006 = Not Run

Supermicro SuperServer (Intel Xeon X5570, 2.93 GHz)

SPECfp_rate_base2006 = 186

CPU2006 license: 3184

Test date: Feb-2009

Test sponsor: Intel Corporation

Hardware Availability: Feb-2009

Tested by: Principled Technologies, Inc.

Software Availability: Feb-2009

Hardware (Continued)

L3 Cache: 8 MB I+D on chip per chip
 Other Cache: None
 Memory: 24 GB (6 x 4 GB DDR3-10600)
 Disk Subsystem: 1 x 160 GB 7200 RPM SATA
 Other Hardware: None

Software (Continued)

Peak Pointers: 32/64-bit
 Other Software: Binutils 2.18.50.0.7.20080502

Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	16	1170	186	1165	187	1168	186									
416.gamess	16	1627	193	1648	190	1642	191									
433.milc	16	820	179	820	179	821	179									
434.zeusmp	16	743	196	741	196	729	200									
435.gromacs	16	599	191	609	188	611	187									
436.cactusADM	16	885	216	886	216	882	217									
437.leslie3d	16	1110	136	1111	135	1113	135									
444.namd	16	730	176	735	175	744	172									
447.dealII	16	669	274	664	275	670	273									
450.soplex	16	980	136	936	143	937	142									
453.povray	16	333	256	334	255	332	256									
454.calculix	16	587	225	588	224	589	224									
459.GemsFDTD	16	1406	121	1405	121	1406	121									
465.tonto	16	779	202	778	202	789	200									
470.libm	16	1750	126	1752	125	1754	125									
481.wrf	16	778	230	781	229	783	228									
482.sphinx3	16	1546	202	1547	202	1542	202									

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.
 numactl was used to bind copies to the cores

Base Compiler Invocation

C benchmarks:
 icc

C++ benchmarks:
 icpc

Continued on next page

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SPEC CFP2006 Result

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Supermicro Computer, Inc.

SPECfp_rate2006 = Not Run

Supermicro SuperServer (Intel Xeon X5570, 2.93 GHz)

SPECfp_rate_base2006 = 186

CPU2006 license: 3184

Test sponsor: Intel Corporation

Tested by: Principled Technologies, Inc.

Test date: Feb-2009

Hardware Availability: Feb-2009

Software Availability: Feb-2009

Base Compiler Invocation (Continued)

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

icc ifort

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
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:

-xSSE4.2 -ipo -O3 -no-prec-div -static

C++ benchmarks:

-xSSE4.2 -ipo -O3 -no-prec-div -static

Fortran benchmarks:

-xSSE4.2 -ipo -O3 -no-prec-div -static

Benchmarks using both Fortran and C:

-xSSE4.2 -ipo -O3 -no-prec-div -static

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SPEC CFP2006 Result

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Supermicro Computer, Inc.

Supermicro SuperServer (Intel Xeon X5570, 2.93 GHz)

SPECfp_rate2006 = Not Run

SPECfp_rate_base2006 = 186

CPU2006 license: 3184

Test sponsor: Intel Corporation

Tested by: Principled Technologies, Inc.

Test date: Feb-2009

Hardware Availability: Feb-2009

Software Availability: Feb-2009

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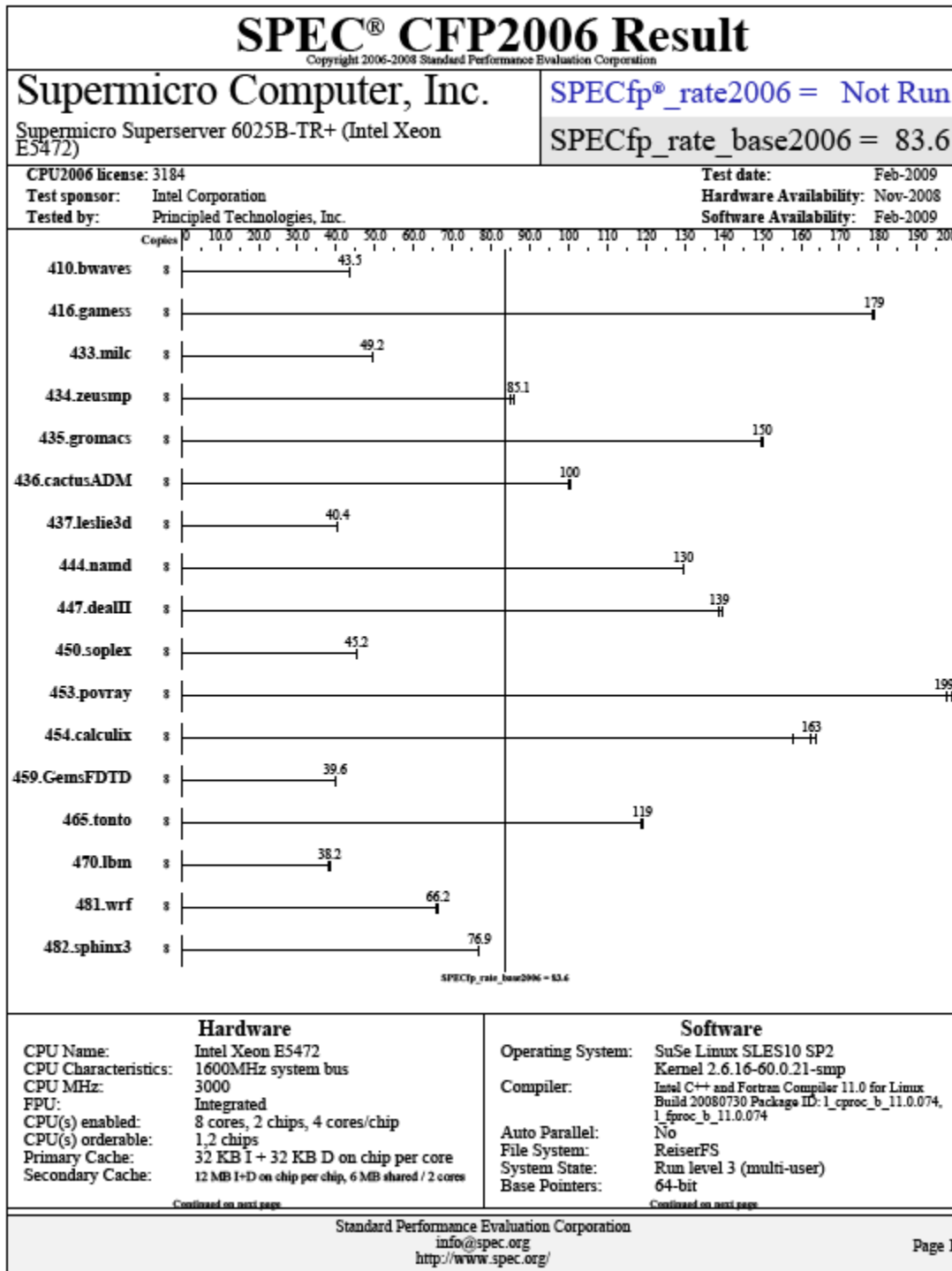
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Tested with SPEC CPU2006 v1.1.
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SUSE Linux Enterprise Server 10: Intel Xeon processor E5472-based server



SPEC CFP2006 Result

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Supermicro Computer, Inc.

SPECfp_rate2006 = Not Run

Supermicro Superserver 6025B-TR+ (Intel Xeon E5472)

SPECfp_rate_base2006 = 83.6

CPU2006 license: 3184

Test date: Feb-2009

Test sponsor: Intel Corporation

Hardware Availability: Nov-2008

Tested by: Principled Technologies, Inc.

Software Availability: Feb-2009

Hardware (Continued)

L3 Cache: None
 Other Cache: None
 Memory: 16 GB (8 x 2 GB DDR2-6400F)
 Disk Subsystem: 1 x 160 GB SATA, 7200 RPM
 Other Hardware: None

Software (Continued)

Peak Pointers: 32/64-bit
 Other Software: Binutils 2.18.50.0.7.20080502

Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	8	<u>2498</u>	<u>43.5</u>	2502	43.5	2497	43.5									
416.gamess	8	<u>876</u>	<u>179</u>	876	179	877	179									
433.milc	8	1492	49.2	<u>1492</u>	<u>49.2</u>	1493	49.2									
434.zeusup	8	<u>855</u>	<u>85.1</u>	848	85.8	859	84.8									
435.gromacs	8	382	150	381	150	<u>381</u>	<u>150</u>									
436.cactusADM	8	955	100	<u>954</u>	<u>100</u>	953	100									
437.leslie3d	8	<u>1863</u>	<u>40.4</u>	1858	40.5	1865	40.3									
444.namd	8	<u>495</u>	<u>130</u>	495	130	495	130									
447.dealII	8	<u>659</u>	<u>139</u>	660	139	654	140									
450.soplex	8	1477	45.2	1473	45.3	<u>1476</u>	<u>45.2</u>									
453.povray	8	215	198	213	200	<u>214</u>	<u>199</u>									
454.calculix	8	403	164	<u>406</u>	<u>163</u>	418	158									
459.GemsFDTD	8	<u>2141</u>	<u>39.6</u>	2130	39.9	2142	39.6									
465.tonto	8	<u>661</u>	<u>119</u>	663	119	661	119									
470.libm	8	2877	38.2	<u>2876</u>	<u>38.2</u>	2874	38.2									
481.wrf	8	1346	66.4	<u>1349</u>	<u>66.2</u>	1358	65.8									
482.sphinx3	8	2030	76.8	2026	77.0	<u>2027</u>	<u>76.9</u>									

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.
 taskset was used to bind processes to cores except for 436.cactusADM peak

General Notes

OMP_NUM_THREADS set to number of processors
 KMP_AFFINITY set to "physical,0"
 KMP_STACKSIZE set to 64M
 Hardware Prefetch Enabled and Adjacent Sector Prefetch Disabled
 'ulimit -s unlimited' was used to set the stack size to unlimited prior to run

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SPEC CFP2006 Result

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Supermicro Computer, Inc.

SPECfp_rate2006 = Not Run

Supermicro Superserver 6025B-TR+ (Intel Xeon E5472)

SPECfp_rate_base2006 = 83.6

CPU2006 license: 3184

Test sponsor: Intel Corporation

Tested by: Principled Technologies, Inc.

Test date: Feb-2009

Hardware Availability: Nov-2008

Software Availability: Feb-2009

Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

icc ifort

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.deall: -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:

-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch

C++ benchmarks:

-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch

Fortran benchmarks:

-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch

Benchmarks using both Fortran and C:

-xSSE4.1 -ipo -O3 -no-prec-div -static -opt-prefetch

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SPEC CFP2006 Result

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Supermicro Computer, Inc.

Supermicro Superserver 6025B-TR+ (Intel Xeon E5472)

SPECfp_rate2006 = Not Run

SPECfp_rate_base2006 = 83.6

CPU2006 license: 3184

Test sponsor: Intel Corporation

Tested by: Principled Technologies, Inc.

Test date: Feb-2009

Hardware Availability: Nov-2008

Software Availability: Feb-2009

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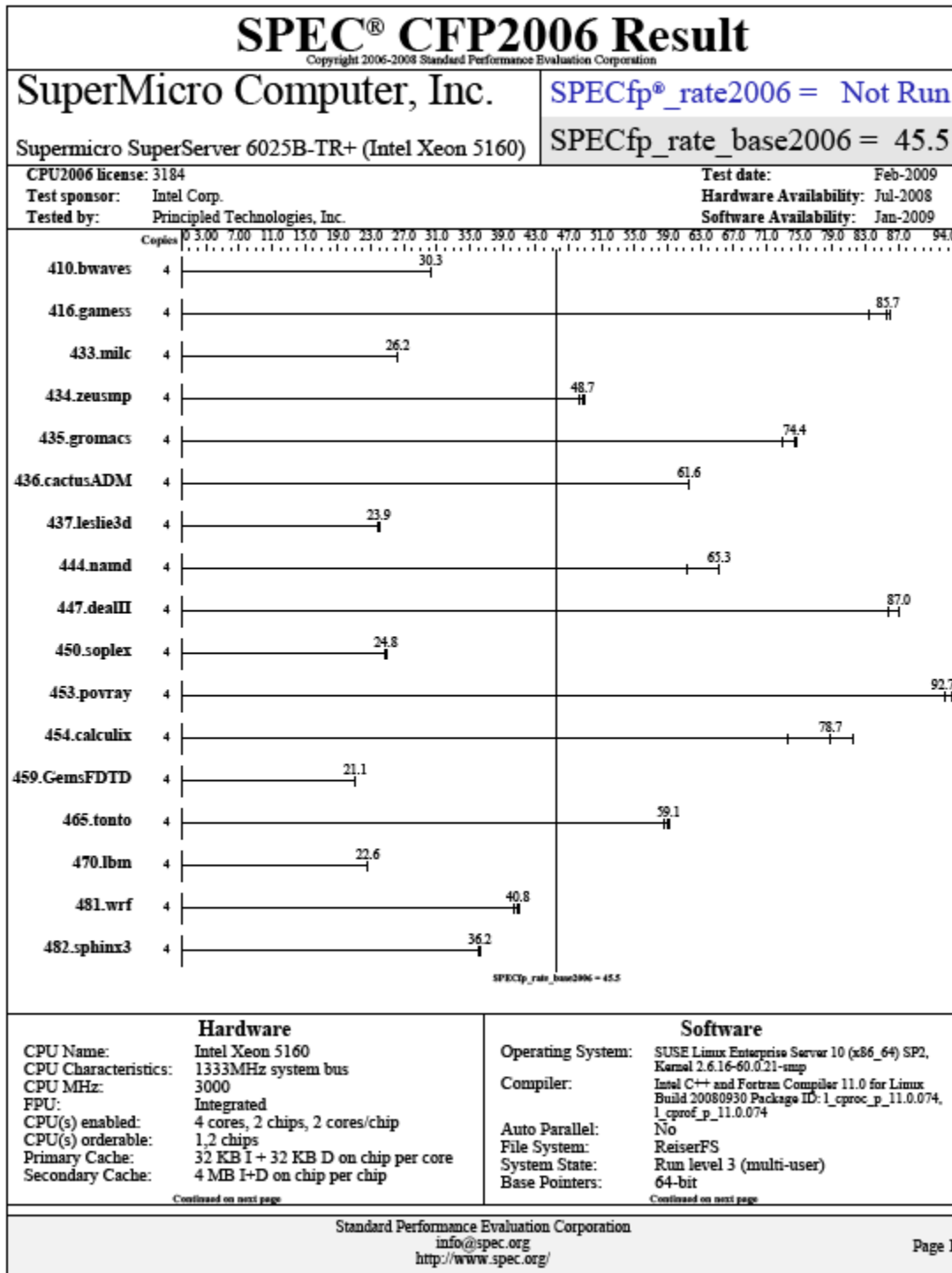
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Tested with SPEC CPU2006 v1.1.
Report generated on Fri Mar 6 14:22:09 2009 by SPEC CPU2006 PS/PDF formatter v6128.

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SUSE Linux Enterprise Server 10: Intel Xeon processor 5160-based server



SPEC CFP2006 Result

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SuperMicro Computer, Inc.

SPECfp_rate2006 = Not Run

Supermicro SuperServer 6025B-TR+ (Intel Xeon 5160)

SPECfp_rate_base2006 = 45.5

CPU2006 license: 3184

Test date: Feb-2009

Test sponsor: Intel Corp.

Hardware Availability: Jul-2008

Tested by: Principled Technologies, Inc.

Software Availability: Jan-2009

Hardware (Continued)

L3 Cache: None
 Other Cache: None
 Memory: 16 GB (8 x 2GB DDR2-5300F)
 Disk Subsystem: 1 x 160 GB SATA, 7200 RPM
 Other Hardware: None

Software (Continued)

Peak Pointers: 32/64-bit
 Other Software: Microquill SmartHeap V8.1
 Binutils 2.19

Results Table

Benchmark	Base								Peak							
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio		
410.bwaves	4	1798	30.2	1796	30.3	1796	30.3									
416.gamess	4	911	85.9	914	85.7	939	83.4									
433.milc	4	1403	26.2	1398	26.3	1399	26.2									
434.zeusmp	4	748	48.7	754	48.3	745	48.9									
435.gromacs	4	383	74.6	384	74.4	392	72.9									
436.cactusADM	4	776	61.6	777	61.5	776	61.6									
437.leslie3d	4	1568	24.0	1572	23.9	1571	23.9									
444.namd	4	491	65.3	492	65.3	522	61.4									
447.dealII	4	526	87.0	525	87.2	533	85.8									
450.soplex	4	1345	24.8	1343	24.8	1347	24.8									
453.povray	4	227	93.6	229	92.7	230	92.7									
454.calculix	4	405	81.5	419	78.7	448	73.6									
459.GemsFDTD	4	2014	21.1	2011	21.1	2010	21.1									
465.tonto	4	664	59.3	666	59.1	672	58.6									
470.libm	4	2430	22.6	2430	22.6	2430	22.6									
481.wrf	4	1092	40.9	1106	40.4	1094	40.8									
482.sphinx3	4	2155	36.2	2151	36.3	2155	36.2									

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.
 taskset was used to bind processes to cores except
 for 436.cactusADM peak
 OMP_NUM_THREADS set to number of processors
 KMP_AFFINITY set to "physical,0"
 KMP_STACKSIZE set to 64M

Base Compiler Invocation

C benchmarks:
 icc

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SPEC CFP2006 Result

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SuperMicro Computer, Inc.

SPECfp_rate2006 = Not Run

Supermicro SuperServer 6025B-TR+ (Intel Xeon 5160)

SPECfp_rate_base2006 = 45.5

CPU2006 license: 3184

Test sponsor: Intel Corp.

Tested by: Principled Technologies, Inc.

Test date: Feb-2009

Hardware Availability: Jul-2008

Software Availability: Jan-2009

Base Compiler Invocation (Continued)

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

icc ifort

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
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:

-xSSSE3 -ipo -O3 -no-prec-div -static -opt-prefetch

C++ benchmarks:

-xSSSE3 -ipo -O3 -no-prec-div -static -opt-prefetch

Fortran benchmarks:

-xSSSE3 -ipo -O3 -no-prec-div -static -opt-prefetch

Benchmarks using both Fortran and C:

-xSSSE3 -ipo -O3 -no-prec-div -static -opt-prefetch

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SPEC CFP2006 Result

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SuperMicro Computer, Inc.

SPECfp_rate2006 = Not Run

Supermicro SuperServer 6025B-TR+ (Intel Xeon 5160)

SPECfp_rate_base2006 = 45.5

CPU2006 license: 3184

Test sponsor: Intel Corp.

Tested by: Principled Technologies, Inc.

Test date: Feb-2009

Hardware Availability: Jul-2008

Software Availability: Jan-2009

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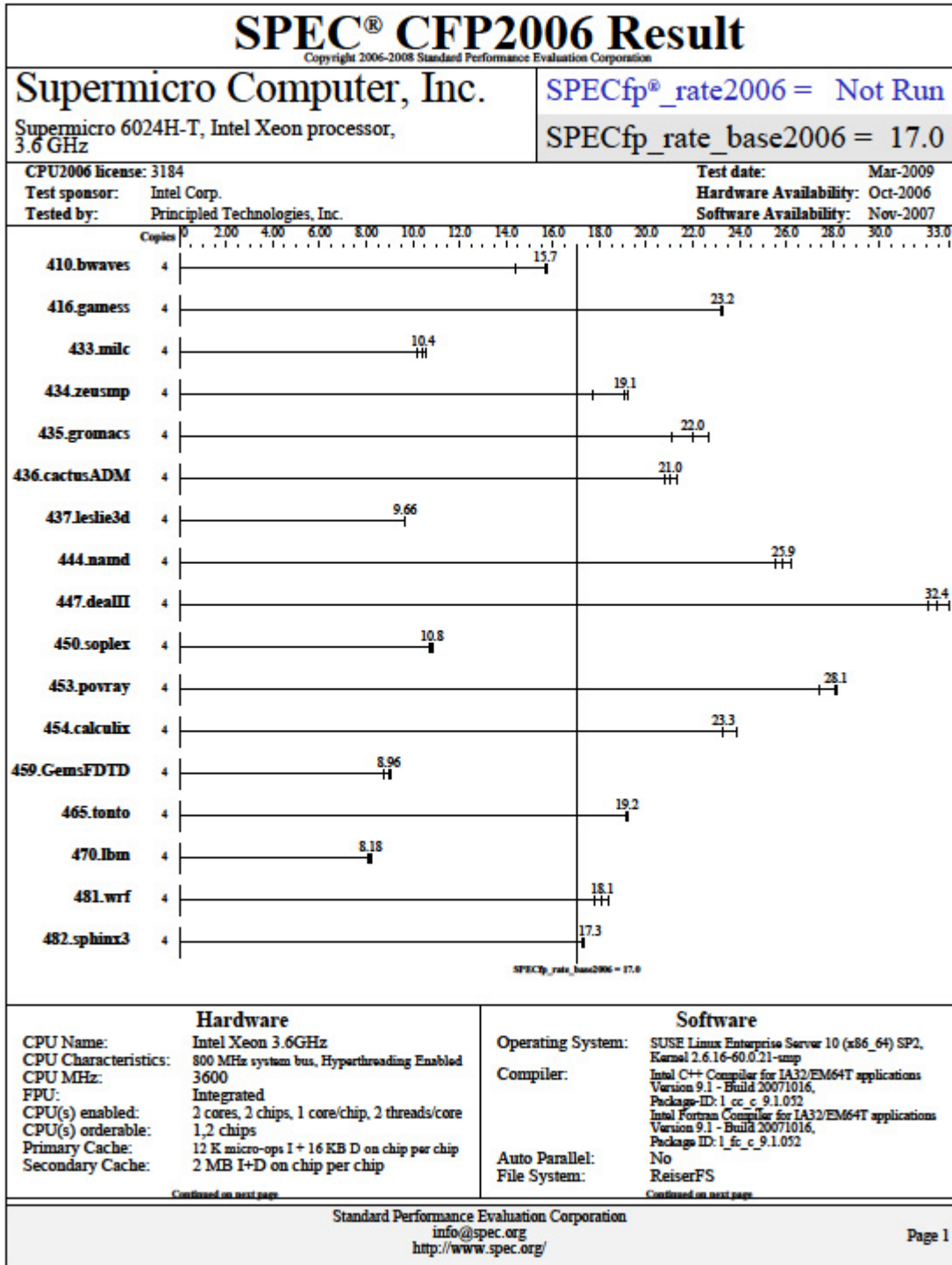
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Report generated on Fri Mar 6 15:12:53 2009 by SPEC CPU2006 PS/PDF formatter v6128.

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SUSE Linux Enterprise Server 10: Intel Xeon processor 3.6 GHz-based server



SPEC CFP2006 Result

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Supermicro Computer, Inc.

SPECfp_rate2006 = Not Run

Supermicro 6024H-T, Intel Xeon processor,
3.6 GHz

SPECfp_rate_base2006 = 17.0

CPU2006 license: 3184

Test sponsor: Intel Corp.

Tested by: Principled Technologies, Inc.

Test date: Mar-2009

Hardware Availability: Oct-2006

Software Availability: Nov-2007

Hardware (Continued)

L3 Cache: None
 Other Cache: None
 Memory: 16 GB (8x2 GB DDR PC2700R)
 Disk Subsystem: Western Digital WD1600AAJS-11B4A0
 (SATA, 160GB, 7200rpm)
 Other Hardware: None

Software (Continued)

System State: Multiuser, Runlevel 3
 Base Pointers: 64-bit
 Peak Pointers: 32/64-bit
 Other Software: Smart Heap Library, Version 8.1

Results Table

Benchmark	Base						Peak						
	Copies	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Copies	Seconds	Ratio	Seconds	Ratio	
410.bwaves	4	3775	14.4	3445	15.8	3471	15.7						
416.gamess	4	3379	23.2	3365	23.3	3369	23.2						
433.milc	4	3607	10.2	3522	10.4	3489	10.5						
434.zeusmp	4	1907	19.1	1894	19.2	2055	17.7						
435.gromacs	4	1299	22.0	1355	21.1	1258	22.7						
436.cactusADM	4	2296	20.8	2274	21.0	2245	21.3						
437.leslie3d	4	3892	9.66	3885	9.68	3908	9.62						
444.namd	4	1241	25.9	1225	26.2	1255	25.6						
447.dealII	4	1411	32.4	1389	33.0	1428	32.1						
450.soplex	4	3112	10.7	3088	10.8	3069	10.9						
453.povray	4	757	28.1	756	28.2	777	27.4						
454.calculix	4	1419	23.3	1383	23.9	1416	23.3						
459.GemsFDTD	4	4850	8.75	4737	8.96	4689	9.05						
465.tonto	4	2055	19.2	2060	19.1	2050	19.2						
470.libm	4	6779	8.11	6720	8.18	6699	8.20						
481.wrf	4	2467	18.1	2515	17.8	2432	18.4						
482.sphinx3	4	4523	17.2	4516	17.3	4502	17.3						

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

'ulimit -s unlimited' was used to set the stacksize to unlimited prior to run
 '/usr/bin/taskset' used to bind processes to CPUs

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SPEC CFP2006 Result

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Supermicro Computer, Inc.

SPECfp_rate2006 = Not Run

Supermicro 6024H-T, Intel Xeon processor,
3.6 GHz

SPECfp_rate_base2006 = 17.0

CPU2006 license: 3184

Test sponsor: Intel Corp.

Tested by: Principled Technologies, Inc.

Test date: Mar-2009

Hardware Availability: Oct-2006

Software Availability: Nov-2007

General Notes

The system bus runs at 800 MHz

Base Compiler Invocation

C benchmarks:

icc

C++ benchmarks:

icpc

Fortran benchmarks:

ifort

Benchmarks using both Fortran and C:

icc ifort

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
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:

-fast

C++ benchmarks:

-fast

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Supermicro Computer, Inc. Supermicro 6024H-T, Intel Xeon processor, 3.6 GHz	SPECfp_rate2006 = Not Run SPECfp_rate_base2006 = 17.0
CPU2006 license: 3184 Test sponsor: Intel Corp. Tested by: Principled Technologies, Inc.	Test date: Mar-2009 Hardware Availability: Oct-2006 Software Availability: Nov-2007
Base Optimization Flags (Continued)	
Fortran benchmarks: - fast Benchmarks using both Fortran and C: - fast	
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We provide industry-leading technology assessment and fact-based marketing services. We bring to every assignment extensive experience with and expertise in all aspects of technology testing and analysis, from researching new technologies, to developing new methodologies, to testing with existing and new tools.

When the assessment is complete, we know how to present the results to a broad range of target audiences. We provide our clients with the materials they need, from market-focused data to use in their own collateral to custom sales aids, such as test reports, performance assessments, and white papers. Every document reflects the results of our trusted independent analysis.

We provide customized services that focus on our clients' individual requirements. Whether the technology involves hardware, software, Web sites, or services, we offer the experience, expertise, and tools to help you assess how it will fare against its competition, its performance, whether it's ready to go to market, and its quality and reliability.

Our founders, Mark L. Van Name and Bill Catchings, have worked together in technology assessment for over 20 years. As journalists, they published over a thousand articles on a wide array of technology subjects. They created and led the Ziff-Davis Benchmark Operation, which developed such industry-standard benchmarks as Ziff Davis Media's Winstone and WebBench. They founded and led eTesting Labs, and after the acquisition of that company by Lionbridge Technologies were the head and CTO of VeriTest.



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Durham, NC 27703
www.principledtechnologies.com
info@principledtechnologies.com

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